LEARNING MADE EASY

2nd Edition

Asthma

for dummies®

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Learn how to avoid common asthma triggers

Understand the allergy connection

Discover new treatment options and medications

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Asthma

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2nd Edition

by William E. Berger, MD, MBA and Tonya A. Winders, MBA

for dummies®
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Introduction

"I feel like I'm breathing through a straw." "Oh, my aching sinuses." "I can't stop coughing." "My child keeps wheezing." If you've ever uttered words like these, you're not alone. These types of statements often describe asthma symptoms and are some of the most common medical complaints reported by people in the United States and around the world.

Asthma affects more than 25 million people in the United States and is the most common chronic childhood disease. Asthma also leads to almost 2 million emergency room visits and more than 10 million doctor's appointments per year. In fact, costs associated with asthma, including treatment, medications, and lost productivity, exceed $80 billion each year. The incidence of asthma is rising dramatically in the United States and across the globe, particularly in highly developed parts of the world, including Western Europe, Australia, and New Zealand. In fact, many experts now consider asthma a global epidemic.

But enough about facts and figures. We want to talk about you: How are you feeling? Do you, or someone you know, think that feeling unwell is normal just because you have asthma and that the condition can never improve? Unfortunately, many people answer "yes" to this question. However, as we explain throughout this book, the plain, simple, and accurate medical truth is this: Although no cure for asthma exists, when you receive effective, appropriate care from your doctor and you're a motivated participant in your asthma management plan, you can lead a normal, active, and fulfilling life.

About This Book

We wrote this book to give you sound, up-to-date, practical advice — based on our more than 50 years of experience with numerous patients — about dealing with asthma effectively and appropriately. For that reason, the book is structured so that you can jump to sections that most directly apply to your medical condition. You don't need to read this book from cover to cover, although we won't object if you do. (Be careful, though, because when you start reading, you may have a really hard time putting it down!)

This book can also serve as a reference and source of information about the many facets of diagnosing, treating, and managing asthma. Although you may pick up this book to find out more about one aspect of asthma, you may realize later that other topics also apply to you or a loved one.

Don't worry about remembering where related subjects are in the book. We provide ample cross-references in every chapter that remind you where to look for the information you may need within other sections of the chapter you're currently reading or in other chapters.

The information in this book is designed to empower you as a person with asthma, thus helping you

- Set goals for your treatment
- Ensure that you receive the most appropriate and effective medical care for your respiratory condition
- Do your part as a patient by adhering to the treatment plan that you and your physician develop

Foolish Assumptions

We don't think it's too foolish to assume that you want substantive, scientifically accurate, relevant information about asthma, presented in everyday language, without a lot of medical mumbo jumbo. In this book, you find straightforward explanations of important scientific aspects of asthma and key medical terms. (You also get a chance to work on your Latin and Greek.)

If you've chosen to read our book, we know you're no dummy, so we're willing to go out on a limb and make some further assumptions about you, dear reader:

- You or someone you care about suffers from asthma.
- You want to find out more about asthma as part of improving your medical condition (in consultation with your doctor, of course).
- You want to feel better.
- You really like doctors named Bill.

Icons Used in This Book

You may notice the following icons throughout the margins of the book. They're intended to catch your attention and alert you to the type of information presented in particular paragraphs. Here's what they mean:

The Author Says icon represents us expressing our opinions.

A Warning icon advises you about potential problems, such as symptoms you shouldn't ignore or treatments you may not want to undergo.

Myths and misconceptions about asthma abound. The Myth Buster icon indicates a myth or mistaken belief that many people hold about asthma and debunks it with the truth.

The Remember icon indicates things you shouldn't forget because you may find the information useful in the future.

The See Your Doctor icon alerts you to matters that you should discuss with your physician.

To give you as complete a picture as possible, we occasionally get into more complex details of medical science. The Technical Stuff icon lets you know that's what we're doing so you can delve into the topic further — or skip it. You don't have to read these paragraphs to understand the subject at hand. (However, reading the information with these icons may give you a better handle on managing your medical condition, as well as provide some great material for impressing your friends at your next party.)

You can find plenty of helpful information and advice in paragraphs marked with the Tip icon.

Beyond the Book

The online Cheat Sheet at www.dummies.com provides an important list of myths and misconceptions about asthma and allergies, as well as a list of problems that often affect asthma patients. We've also included a Top Ten List of Common Asthma Triggers.

Where to Go from Here

Although you can read this book from cover to cover if you want, we suggest turning to the table of contents and finding the sections that apply to your immediate concern. Then begin reading your way to better management of your asthma.

1 Getting Started with Asthma

IN THIS PART . . .

Understand what asthma is, who gets it, and why.

Line up a healthcare team and find out how to work well with them.

Deal with doctor visits, tests, and setting goals.

Personalize your asthma care and stay informed about your condition.

Recognize asthma severity levels, manage asthma for the long term, and improve your quality of life.

IN THIS CHAPTER

- Understanding what asthma is and who gets it
- Digging into the types of asthma
- Figuring out if you have asthma
- Creating an asthma management plan

Chapter 1

Understanding Asthma Basics

According to many experts, asthma is now a global epidemic, and its prevalence and severity continue to grow in many parts of the world, including the United States, Western Europe, Australia, and New Zealand. More than 25 million people in the United States alone and more than 330 million globally have some form of asthma. Taking care of asthma means taking care of your whole body — from your brain to your nose to your lungs — and we are here to help you along the journey as you discover what asthma is, how to treat and manage it, and how to prevent complications.

This chapter starts with the basics of asthma: what it is and how it affects you. Although much of this may seem like high school biology, it's helpful to understand the contributing factors of asthma, as well as how to live a full life with the condition. You may be surprised to also find out who else lives with asthma since it affects so many people . . . even famous ones, as we highlight in the sidebar "Famous folks with asthma."

Defining Asthma

You or someone you love has just been diagnosed with asthma. That isn't easy to hear, and it's natural to feel afraid or overwhelmed by this unsettling news. The good news is that scientists now know more than ever before about asthma and

how to manage it, and the following sections will help you develop a basic understanding of how asthma affects you.

Asthma is a chronic condition that starts with the immune system and can impact many organs, including the lungs. A wide range of factors can trigger an asthma attack or flare: exercise, cold air, a virus, pollution, smoke, and, for many, a host of allergens. In fact, about 80 percent of children with asthma also have allergies. We talk more about allergies and other asthma triggers in Chapter 6.

Your lung airways are vital to your health. This network of bronchial tubes enables your lungs to absorb oxygen into the blood and get rid of carbon dioxide; the process is called respiration or breathing. Most people take breathing for granted; you usually don't need to even think about it unless something interferes with the process by obstructing your airways.

How normal breathing works

To better understand how asthma adversely affects your airways, consider what happens in normal breathing:

- The air you inhale flows into your nose and/or mouth and into your *trachea,* or windpipe.
- Your trachea then divides in the lung into right and left main *bronchi,* or branches, funneling the air into each of your lungs.
- The main bronchi continue branching out into your lungs and dividing into a network of airways called *bronchial tubes*. The outside of your bronchial tubes consists of layers of muscles that relax and tighten as you inhale and exhale. Doctors refer to airway relaxation as *bronchodilation* and to the tightening that can help your lungs push out air when you exhale as *bronchoconstriction*.
- Your network of airways ultimately leads to the *alveoli,* tiny air sacs that look like small clusters of grapes. They contain blood vessels and provide the means for vital respiratory exchange. Oxygen from the air you breathe is absorbed into the bloodstream, while carbon dioxide gas from your blood exits your body as you exhale. In asthma, airway obstruction is most often the result of an underlying airway inflammation that leads to one or more of the following inflammatory responses: airway hyperresponsiveness, airway constriction, or airway congestion. (See the next section for more information.) Eventually, these inflammatory responses can lead to a vicious cycle in which your airways become more and more sensitive and inflamed because they're constantly reacting to allergens, irritants, and other factors.

What you can't see can hurt you

If your lungs were external organs — like gills — or if your body were transparent so that you could see what happens internally, more doctors would treat asthma earlier and more aggressively, because you and your doctor could easily see how the underlying disease affects you.

As we explain in the section "Testing your lungs," later in the chapter, you need to make sure that your doctor performs appropriate *pulmonary* (lung) function tests if you have bouts of wheezing, recurring coughs, lingering colds, or other symptoms that may indicate an underlying respiratory ailment.

How airway obstruction develops

Here's an overview of how the mechanisms of asthma interact. Although we've itemized these processes to explain them, keep in mind that they're often ongoing events that can occur simultaneously in your lungs. As you read these descriptions, take a look at Figure 1-1, which compares a normal airway with an asthmatic airway.

- **Airway constriction:** When a trigger or precipitating factor irritates your airways, causing the release of chemical mediators such as histamine and leukotrienes (see Chapter 13) from the mast cells — which release chemical mediators that cause inflammatory responses — of the *epithelium* (the lining of the airway), the muscles around your bronchial tubes can tighten, leading to *airway constriction.* This process results in narrowing airways and breathing difficulty. Airway constriction can also occur in people who don't have asthma or allergies if they're exposed to substances that can harm their respiratory systems, such as poisonous gases or smoke from a burning building.
- **Airway hyperresponsiveness:** The underlying airway inflammation in asthma can cause *airway hyperresponsiveness* as the muscles around your bronchial tubes twitch or feel ticklish. This twitchy or ticklish feeling indicates that your muscles overreact and tighten, causing acute bronchoconstriction or bronchospasms even if you're exposed only to otherwise harmless substances, such as allergens and irritants that rarely provoke reactions in people without asthma and allergies (see the section "Uncovering the Many Facets of Asthma," later in this chapter).
- **Airway congestion:** Mucus and fluids are released as part of the inflammatory process and can accumulate in your airways, overwhelming the *cilia* (tiny hairlike projections from certain cells that sweep debris-laden mucus through your airways) and leading to *airway congestion.* This accumulation of mucus and fluids may make you feel the urge to cough up phlegm to relieve your chest congestion.

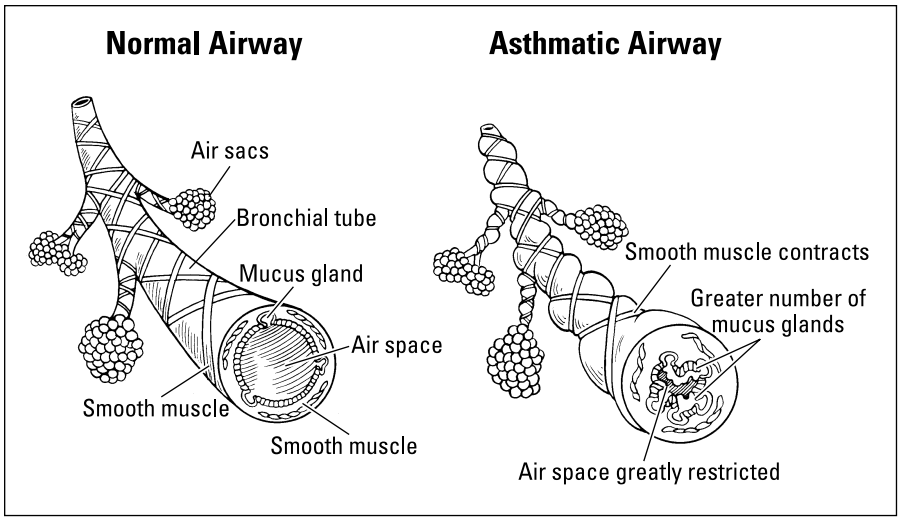

FIGURE 1-1: A normal airway and an asthmatic airway. Note the muscle contractions (bronchospasms) and airway inflammation.

- **Airway edema:** The long-term release of inflammatory fluids in constricted, hyperresponsive, and congested airways can lead to *airway edema* (swelling of the airway), causing bronchial tubes to become more rigid and further interfering with airflow. In severe cases of airway congestion and edema, a chronic buildup of mucus secretion leads to the formation of mucus plugs in the airway, which limits airflow.
- **Airway remodeling:** If airway inflammation is left untreated or poorly managed for many years, the constant injury to your bronchial tubes due to ongoing airway constriction, airway hyperresponsiveness, and airway congestion can lead to *airway remodeling,* as scar tissue permanently replaces your normal airway tissue. As a result of airway remodeling, airway obstruction can persist and may not respond to treatment, leading to the eventual loss of your airway function as well as potentially irreversible lung damage.
- **Cellular infiltration:** This complex cellular mechanism, characterized by either predominant eosinophils or neutrophils, is involved in the airway remodeling seen in chronic asthma. As researchers continue to gain a greater understanding of this process, improved novel therapeutic approaches will allow for more targeted treatments of asthma and allergic diseases (see Chapter 13).

REMEMBER

This vicious cycle of asthma can develop gradually, over hours or even days following exposure to triggers or precipitating factors. After this cycle is set in motion, you can suffer severe and long-lasting consequences.

Understanding Who Gets Asthma and Why

The strongest predictor that an individual may develop asthma is a family history of allergies and asthma and/or *atopy*, an inherited tendency to develop hypersensitivities to allergic triggers. This tendency is almost always due to an overactive immune system that produces elevated levels of immunoglobulin E (IgE) antibodies to allergens. (See Chapter 11 for an extensive discussion of this process.)

The predisposition to asthma is inherited. This genetic inheritance can be a significant factor in developing the condition: Two-thirds of asthma patients have a family member who also has the disease.

Most cases of asthma are of an allergic nature (known as *allergic asthma*), and usually begin to manifest during childhood, affecting boys more often than girls. In fact, asthma is the most common chronic disease of childhood. Other allergic disorders, such as food allergies, *atopic dermatitis* (allergic eczema), or *allergic rhinitis* (hay fever), which are also indicators of atopy in young children, can precede this form of the ailment, often referred to as *childhood-onset asthma*.

Adult-onset asthma, which is less common than childhood-onset asthma, develops in adults older than 40, more often in women. Atopy doesn't appear to play a role in these cases. Rather, adult-onset asthma more often seems to be triggered by various nonallergic factors, including sinusitis, upper respiratory infections, nasal polyps, gastroesophageal reflux disease (GERD), sensitivities to aspirin and related nonsteroidal anti-inflammatory drugs (NSAIDs), as well as occupational exposures to chemicals, such as those found in fumes, gases, resins, dust, and insecticides. However, many episodes seem to occur spontaneously without known triggers.

REMEMBER

Keep these points in mind about asthma:

- Important symptoms of asthma in infancy and early childhood include persistent coughing, wheezing, and recurring or lingering chest colds.
- Inflammation of the airways is the single most important underlying factor in asthma. If you have asthma, your symptoms may come and go, but the underlying inflammation usually persists. Episodes of asthma symptoms can vary in length from minutes to hours and even from days to weeks, depending on your medical treatment (see Chapter 5), the severity of your symptoms (see Chapter 14), and the character of the triggering mechanism (see Chapter 6).

- Although no cure for asthma exists, in most cases you can manage and even reverse the effects of the disease. However, poorly managed or undertreated asthma may lead to loss of airway functions and, in some cases, irreversible lung damage as a result of airway remodeling. (Read about airway remodeling earlier in this chapter in the section "How airway obstruction develops.")
- Early, aggressive treatment with appropriate medication is vital to effectively managing your asthma.

Identifying triggers, attacks, episodes, and symptoms

A wide variety of allergens, irritants, and other factors, such as colds, flu, exercise, and drug sensitivities, can trigger asthma symptoms — what you may refer to as *asthma attacks* or *asthma episodes.* (See Chapter 6 for more information about asthma triggers and how to avoid them.) Asthma symptoms can range from decreased tolerance to exercise, to feeling completely out of breath, and from persistent coughing to wheezing, chest tightness, or life-threatening respiratory distress. In many cases, a bothersome cough may be the only symptom of asthma you even notice.

WHY AREN'T ANTIBIOTICS CURING MY BRONCHITIS?

Bronchitis is a general term for inflammation of the *bronchi,* or airways. (*Itis* is Greek for swelling or inflammation.) The most frequent causes of bronchial or airway inflammation are viral or bacterial infections, smoking, or asthma.

Because the coughing symptoms in different types of airway inflammation can appear similar and because bacterial infections of the airway are common, some patients who actually have asthma are mistakenly treated with antibiotics. Although these drugs can clear bacterial infections of the airways, they don't relieve or control asthma symptoms.

If you experience lingering coughs, recurring colds, or similar symptoms that can indicate bronchitis, make sure your doctor performs appropriate lung-function tests to check for reversible airflow obstruction, a hallmark of asthma. Performing such tests gives doctors the information they need to prescribe appropriate and effective treatment for your condition.

WARNING

Experiencing asthma symptoms, whatever the intensity, means that your asthma isn't temporarily well controlled. Such symptoms may indicate that your asthma needs more effective management, as we explain in the section "Managing Asthma Effectively," later in this chapter.

Realizing that asthma isn't all in your head

MYTH BUSTER

Until recently, many healthcare providers and family members approached asthma as a nervous disorder, thought to be caused by anxiety and psychological stress. Doctors and researchers now know that this misconception has no basis in fact. Asthma occurs in your lungs' airways, not in your head.

Although anxiety and stress can aggravate your asthma (as well as other illnesses), psychological factors don't cause your condition. Unfortunately, we still hear about the friends and family of asthmatics who claim that asthma is all in the patient's head. Some of these people insist that if the person would just calm down, their condition would go away. Instead of stress causing asthma, it can be the other way around: Breathing problems can cause stress. Stressing out because you can't breathe is a perfectly normal and understandable response.

Therefore, a proper diagnosis of asthma and/or allergies and early, aggressive treatment for these conditions are crucial. In most cases, you should be able to control your asthma and allergy condition so that it doesn't control you, thus enabling you to lead a full and active life. Forget the negative stereotypes of asthmatics and people with allergies as nerdy, weak, anxious types, forever coughing and blowing their noses. Asthma and allergies can affect anyone: from the captain of the chess team to the captain of the football team, as well as everybody in between.

Preventing asthma: Can it be done?

Although totally preventing asthma isn't yet possible, you and your doctor can design a step-by-step plan for living with your condition and preventing asthma attacks.

With your doctor and healthcare team, write a detailed plan for taking medications and managing an asthma attack and then follow that action plan. (See the section "Asthma self-management/asthma action plan," later in this chapter.) Careful planning and avoiding asthma triggers are the best ways to prevent asthma attacks, especially in children as their lungs develop. The following are some components you may include in your plan:

- **Limit exposure to asthma triggers.** Avoid the allergens and irritants that trigger asthma symptoms.

- **Don't allow smoking around you (or your child).** Exposure to tobacco smoke during infancy is a strong risk factor for childhood asthma, as well as a common trigger of asthma attacks.
- **Be active and encourage your child with asthma to do so too.** As long as your asthma is well controlled, regular physical activity can help your lungs work more efficiently.
- **See the doctor when necessary.** Check in regularly. Don't ignore signs that your asthma may not be under control, such as needing to use a quick-relief inhaler too often. Asthma changes over time. Consulting your doctor can help you make needed treatment adjustments to keep symptoms under control.
- **Maintain a healthy weight.** Being overweight can worsen asthma symptoms, and it puts you at risk of other health problems.
- **Keep heartburn under control.** Acid reflux or severe heartburn (GERD) may worsen your asthma symptoms. You may need over-the-counter or prescription medications to control acid reflux.

REDUCING INEQUITIES IN ASTHMA CARE

Consistent treatment and compliance with your asthma plan are vital elements in maintaining adequate control of your condition. Even if you're in good financial shape, effectively managing your condition — especially if it's severe — can be challenging. For those who are less financially secure, however, health disparities can make any chronic condition — not just asthma — even more difficult to handle.

According to the Centers for Disease Control and Prevention (CDC), disparities in health care in the United States are a driving force in the increasing prevalence of asthma. This prevalence is most notable among poor children, non-Hispanic Black children, women, and poor adults.

Healthy People 2020 (the federal government's framework for a healthier country) defines health disparities as "a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage." Social determinants of health, including limited medical care options, economic challenges, substandard housing, lack of transportation, living far from an allergist and/or pulmonologist, as well as cultural and language barriers, racial discrimination, and polluted environments, may account for much of these disparities. Reducing health disparities and promoting health equity are both priorities of the CDC and Healthy People 2020.

Health equity is defined by the National Library of Medicine as "the state in which everyone has the opportunity to attain full health potential, and no one is disadvantaged from achieving this potential because of social position or any other socially defined circumstance."

Achieving greater health equity in asthma care so that all patients will have the best opportunity to lead healthier and more fulfilling lives also requires expanding health literacy, particularly among disadvantaged communities.

Recognizing the urgent need for improving health literacy and social determinants of health, and to reduce disparities in treatment and outcomes between more affluent and less affluent asthma patients, Dr. LeRoy Graham developed Not One More Life (NOML) in 2002. This community-based program of education, screening, counseling, and monitoring brings asthma care to churches and schools in historically underserved communities and provides a model for helping asthma patients thrive despite the economic and social hardships they may face. The NOML program is now housed at Allergy & Asthma Network and serves thousands of people each year in underserved communities. For more information on NOML and this topic, please visit `https://allergyasthmanetwork.org/health-disparities/`.

Uncovering the Many Facets of Asthma

Asthma can show up in various ways. The underlying mechanism causing many of the symptoms of asthma is due to a complex series of events involving many types of cells and tissue that reside in your lungs.

Because such a wide range of factors can precipitate asthma symptoms, and because certain triggers can cause stronger reactions in some asthma patients than in others, doctors often classify asthma according to the triggers that instigate your symptoms. Classifying asthma in this way can help you and your doctor understand the cause of your symptoms.

Although a certain precipitating factor may predominate in many asthma cases, multiple triggers affect the majority of people with asthma. For example, most asthmatics have exercise-induced asthma, sometimes known as exercise-induced bronchospasm — which we explain in the "Exercise-induced asthma," later in this section — in addition to asthma that manifests from other triggers or precipitating factors. The next sections list the main asthma classifications that many doctors use.

Allergic asthma

Allergic (or *atopic*) asthma is asthma that's triggered by allergens like pollen, pets, and dust mites. About 80 percent of people with allergic asthma have a related condition like hay fever, eczema, or food allergies.

If you have allergic asthma, your doctor is likely to prescribe a *preventer inhaler* to take every day and a *reliever inhaler* to use when you have asthma symptoms. It's also important to avoid your asthma triggers as much as possible.

Nonallergic asthma

Nonallergic asthma, or *nonatopic* asthma, is a type of asthma that isn't related to an allergy trigger like pollen or dust and is less common than allergic asthma. The causes are not well understood, but it often develops later in life and can be more severe than other types of asthma.

Occupational asthma

Occupational asthma is caused directly by the work you do. You may have occupational asthma if

- Your asthma symptoms started in adulthood.
- Your asthma symptoms improve on the days you're not at work.

Occupational asthma is usually a type of allergic asthma. For example, if you work in a bakery, you may be allergic to flour dust, or if you work in health care, the dust from latex gloves can trigger symptoms.

If you think you may have occupational asthma, make an appointment to see your healthcare provider so you can get the right help. Occupational asthma is not the same as asthma that you already have that's made worse by a trigger at work.

Exercise-induced asthma

Some people without a diagnosis of asthma experience asthma-like symptoms triggered only by exercise. This is often called *exercise-induced asthma* (EIA), but a better term is *exercise-induced bronchoconstriction* (EIB) because the tightening and narrowing of the airways (bronchoconstriction) isn't caused by already having asthma. EIB commonly affects elite athletes or people doing strenuous exercise in very cold conditions.

If you don't have a diagnosis of asthma but you're experiencing symptoms such as chest tightness, breathlessness, coughing, or fatigue during or after exercising, ask your healthcare provider to do the following:

- **Test your lung function with a spirometry test.** This is to make sure you don't have underlying asthma. (see Figure 1-2 later in this chapter).
- **Do some exercise challenge tests**. Usually done on a treadmill or other equipment, this is a way to see how your airways react to exercise. Spirometry tests before and after your exercise test can show whether you have EIB.
- **Give you treatments to help with the symptoms you're experiencing so you can continue to exercise safely.** This may be a reliever inhaler to take immediately before you exercise.

If you need to use your pre-exercise reliever inhaler daily to stop exercise symptoms from coming on, or three or more times a week to relieve symptoms, you should review your treatments. Your doctor may suggest using a daily preventer inhaler or add-on treatments like montelukast and long-acting bronchodilators (see Chapter 13).

Aspirin-induced asthma

Aspirin-induced asthma (AIA) is a condition in which asthma symptoms can develop after taking aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs). It's also known as *aspirin-exacerbated respiratory disease* (AERD) or Samter's Triad. The American Academy of Allergy, Asthma, & Immunology estimates that 9 percent of adults have asthma and that 30 percent of adults who have asthma and nasal polyps may also have AERD.

Acetylsalicylic acid (aspirin) is a type of NSAID used to relieve pain, inflammation, and fever. Similar medications include ibuprofen (Advil) and naproxen (Aleve).

Aspirin and other NSAIDs interact with an enzyme known as cyclooxygenase-1 (COX-1). While the exact triggers are unknown, it's thought that people with AIA have a sensitivity to the way these medications inhibit COX-1.

You may be more prone to AIA if you have all three of these conditions:

- Asthma
- Chronic sinusitis
- Nasal polyps

A doctor may still recommend aspirin for the treatment of other conditions, such as preventing heart attacks or strokes, in cases where a person may have already experienced one of these conditions.

Food allergies and food-induced anaphylaxis

For some people, there may be an indirect connection between food and asthma. Although food isn't a common asthma trigger, your asthma can be affected by eating. Asthma can also affect how you react if you have food allergies.

Some people may notice certain foods bother their asthma. High amounts of sulfites, a type of preservative used in foods, can trigger asthma. Foods that are high in sulfites may include

- Dried fruits and vegetables
- Packaged potatoes
- Wine and beer
- Bottled lime and lemon juice
- Shrimp
- Pickled foods

If your healthcare provider has diagnosed a food allergy, then staying away from the food(s) that trigger your reactions is the only way to prevent problems. Visit Kids With Food Allergies (`https://kidswithfoodallergies.org/what-is-anaphylaxis`) for more information that applies to children as well as adults.

WARNING

Mild and severe symptoms of food allergies can lead to a serious allergic reaction called *anaphylaxis* (anna-fih-*lack*-sis). This reaction usually involves more than one part of the body and can worsen quickly. Anaphylaxis must be treated immediately to provide the best chance for improvement and prevent serious, potentially life-threatening complications.

A severe food allergy reaction can cause trouble breathing. It may be hard to know if you're having a food allergy reaction or an asthma attack. Here are some ways to tell the difference:

- If you are only coughing, wheezing, or having trouble breathing and do not have any symptoms involving other parts of your body, it's probably asthma. Follow your asthma action plan.

- If you had asthma symptoms before eating the food, it's probably asthma. Follow your asthma action plan.
- Food allergy symptoms usually come on quickly after you eat the food to which you're allergic.
- Severe allergic reactions involve two or more body systems. An allergic reaction may involve breathing difficulties, hives, swelling, itchy mouth and throat, nausea, or vomiting. Follow your anaphylaxis action plan (see the next list).

REMEMBER

If you have a food allergy, remember these vital points:

- Always carry two prescribed epinephrine auto-injectors with you.
- Ask your healthcare provider to help you create an anaphylaxis action plan, which will tell you what to do if you have a severe reaction. You can find a sample plan on the Kids with Food Allergies website at `https://kidswithfoodallergies.org/what-is-anaphylaxis`.
- Train trusted friends, family, and coworkers on how to use an epinephrine auto-injector in an emergency and have them practice regularly.
- If you are having trouble breathing and aren't sure if you're having an allergic reaction or an asthma attack, treat it like a food allergy reaction and use your epinephrine auto-injector.

Diagnosing Asthma

Effectively managing your asthma begins with your doctor correctly diagnosing your condition. To determine whether asthma causes your respiratory symptoms, your doctor should take your medical history, perform a physical exam, test your lung functions, and perform other tests, as we explain in the following sections.

REMEMBER

The diagnostic processes that your doctor uses are crucial because, as our colleague Nancy Sander notes, asthma isn't a neat little package of symptoms that you or your doctor can easily identify and eliminate. Asthma symptoms vary widely from patient to patient. In fact, your own symptoms may change over time. Make sure your doctor establishes these key points when diagnosing your asthma:

- You experience episodes of airway obstruction.
- Your airway obstruction is at least partially reversible (and can be improved through treatment).

- Your symptoms result from asthma, not from other conditions that we describe in "Considering other possible diagnoses," later in this chapter.

Taking your medical history

REMEMBER

A careful, thorough medical history is vital in diagnosing the correct cause of your respiratory symptoms. For this reason, your doctor may ask several questions about your condition and your life. Keeping track of symptoms in a diary may help you provide your doctor with details that can assist in making a proper diagnosis. Try to provide your doctor with as much information as possible about the following subjects:

- The type of symptoms you experience, which may include coughing, wheezing, shortness of breath, chest tightness, and *productive coughs* (coughs that bring up mucus).
- The pattern of your symptoms:
  - *Perennial* (year-round), seasonal, or perennial with seasonal worsening.
  - Constant, *episodic* (occasional), or constant with episodic worsening.
- The onset of your symptoms. At what rate do your symptoms develop — rapidly or slowly? And does that rate vary?
- The duration and frequency of your symptoms and whether the type and intensity of symptoms vary at different times of day and night. Especially note if your episodes awaken you from sleep or are more severe when you wake up in the morning.
- The impact that exercise or other physical exertion has on your symptoms.
- Your exposure to potential asthma triggers. In addition to the allergens, irritants, and precipitating factors listed in the section "Uncovering the Many Facets of Asthma," earlier in this chapter, your doctor also needs to know about endocrine factors, such as adrenal or thyroid disease. Special considerations for women are pregnancy or changes in their menstrual cycles.
- The development of your disease, including any treatment and medications you've received or taken and their effectiveness. Your doctor particularly wants to know whether you presently take or have previously taken oral corticosteroids and, if so, the dosage and frequency of use.
- Your family history, especially whether parents, siblings, or close relatives suffer from asthma, allergic or nonallergic rhinitis, and other types of allergies, sinusitis, or nasal polyps.

- Your lifestyle, including
  - Your home's characteristics, such as its age and location; type of cooling and heating system; your basement's condition; whether you have a wood-burning stove, humidifier, carpet over concrete, or mold and mildew; and the types of bedding, carpeting, and furniture coverings you use.
  - Whether anyone smokes in your home or the other locations where you spend time, such as work or school.
  - Any history of substance abuse.
- The impact of the disease on you and your family, such as
  - Any life-threatening symptoms, emergency or urgent care treatments, or hospitalizations.
  - The number of days you (or your child with asthma) tend to miss from school or work, the disease's economic impact, and its effect on your recreational activities.
  - If your child has asthma, your doctor may ask you about the effects of the illness on your youngster's growth, development, behavior, and participation in sports.
- Your knowledge, perception, and beliefs about asthma and long-term management of the disease, as well as your ability to cope with the illness.
- The level of support you receive from your family members and their abilities to recognize if your symptoms suddenly worsen and assist you.

Examining your condition

A physical exam for suspected asthma usually focuses not only on your breathing passageways but also on other characteristics and symptoms of atopic disease. The significant physical signs of asthma or allergy that your doctor looks for primarily include the following:

- Chest deformity, such as an expanded or overinflated chest, as well as hunched shoulders
- Coughing, wheezing, shortness of breath, and other respiratory symptoms
- Increased nasal discharge, swelling, and the presence of nasal polyps
- Signs of sinus disease, such as thick or discolored nasal discharge
- Any allergic skin conditions, such as *atopic dermatitis* (eczema — see "Understanding Who Gets Asthma and Why" earlier in this chapter).

Testing your lungs

Many people are used to routinely taking their temperature or regularly having their doctor check their pulse and blood pressure, in addition to monitoring their blood sugar and cholesterol levels on a consistent basis. However, most people aren't yet in the habit of having routine *pulmonary* (lung) function tests, which may be why asthma is so frequently not diagnosed at an early stage but rather after a severe episode.

Objective pulmonary function tests are the most reliable means of assessing the extent to which your lung function is limited or affected. The following sections explain the most important tests doctors use to diagnose asthma. (See Chapter 3 for a more detailed description of these tests.)

Spirometry

To determine whether you have airway obstruction and whether your condition is *reversible* (can improve with appropriate treatment), doctors often use a *spirometer* to measure the volume of air you exhale from your large and small airways before and 15 minutes after inhaling a short-acting beta$_2$-adrenergic bronchodilator. Figure 1-2 shows a patient using a spirometer.

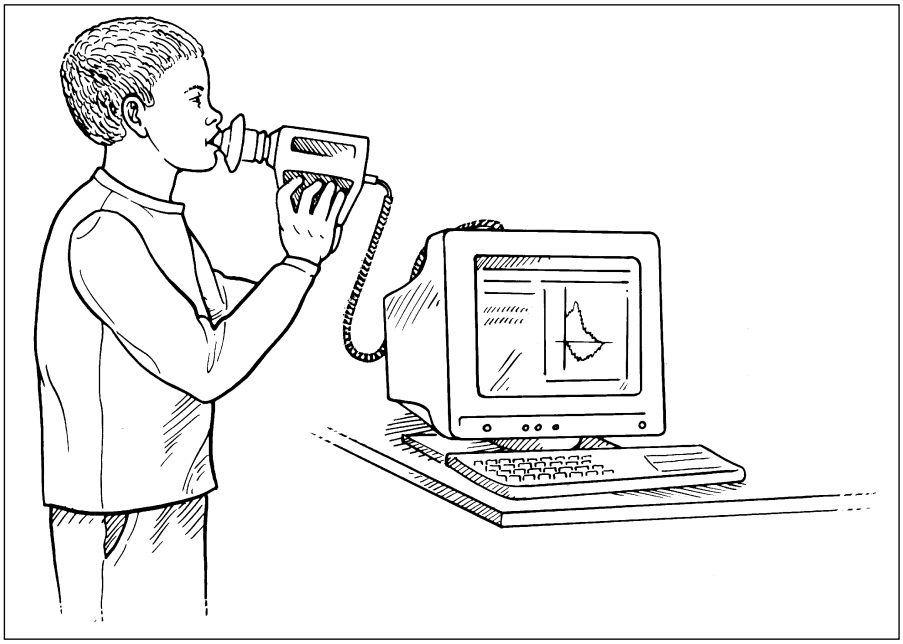

FIGURE 1-2: A spirometer measures airflow.

TECHNICAL STUFF

Spirometry provides many types of airflow measurements, including the following:

- **Forced vital capacity (FVC):** The maximum volume (in liters) of air you can exhale after taking in the deepest breath you can manage.
- **Forced expiratory volume (FEV1):** The volume (in liters) of air you're able to exhale when you breathe out with maximal effort in the first second, as forcefully as possible. Physicians determine a reduction in FEV1 as the most common indicator of airway obstruction in patients with symptoms of asthma. This test, the most important measurement in the diagnosis and management of asthma, generally measures obstruction of the large airways, although FEV1 can also reveal severe obstruction of the small airways. A baseline FEV1 (before using a bronchodilator) that is lower than normal but increases by at least 12 percent 15 minutes after you inhale a short-acting bronchodilator (post-bronchodilator) allows your doctor to conclusively establish the diagnosis of asthma.
- **Maximum midexpiratory flow (MMEF):** The middle part of your forced exhalation (in liters per second). This measurement is also referred to as the *forced expiratory flow between 25 and 75 percent* (FEF 25–75 percent) of FVC. A reduction in MMEF can indicate obstruction of the lungs' small airways.

Your doctor compares the values from the spirometry to the predicted normal reference values, based on your age, height, sex, and race, as established by the American Thoracic Society. The percent of the predicted normal value of your measured FEV1 is one of the major criteria your doctor uses to classify your level of asthma severity. (See Chapter 5 for information on the four levels of asthma severity.)

TIP

Doctors consider spirometry a valuable tool for diagnosing childhood cases of asthma in patients older than 4. However, for younger children, the test can be difficult, if not impossible, to perform. In those cases, your child's physician may decide that trying a peak-flow meter or another less complicated assessment process is more suitable. (See Chapter 18 for information on diagnosing asthma in infants and children.)

Although spirometry is the most common and widely used lung function test, another test called DLCO (diffusing capacity of the lungs for carbon monoxide) is a measurement used by physicians to assess the lung's ability to transfer gas from expired air to the bloodstream. This measurement is often used to differentiate asthma from chronic obstructive pulmonary disease (COPD). See Chapter 18 for further discussion about differences between asthma and COPD.

Peak-flow meters

Just as diabetics check their blood sugar levels with a monitoring device and people with hypertension take their own blood pressure, you can keep an eye on your lung functions at home with a peak-flow meter. *Peak-flow meters*, which are available in a variety of shapes and sizes from different manufacturers, are convenient, portable, and easy-to-use devices for monitoring *peak expiratory flow rate* (PEFR), the maximum rate of air (in liters per minute) you can force out of your large airways, as a measurement of lung function.

This measurement isn't as accurate as spirometry, but you can easily perform it at home. Measurements of PEFR are also a vital part of long-term management of your asthma, as we explain in more depth in Chapter 5.

Challenge tests

If spirometry indicates normal or near-normal lung functions but asthma continues to seem the most likely cause of your symptoms, your doctor may decide that a form of challenge test is necessary for a more conclusive diagnosis.

Challenge tests, also called *bronchoprovocation*, usually involve your doctor administering small doses of inhaled methacholine or histamine, or making you exercise under observation. The goal of such tests is to see whether these challenges cause obstructive changes in your airways, thus provoking mild asthma symptoms. Your doctor usually measures your lung functions before and after each test.

THE JAWS OF ASTHMA

Picture one of those scary shark movies: People swim about peacefully on the ocean surface until a fin suddenly breaks the waves (cue the ominous double basses and cellos) and a shark attacks a hapless swimmer. The shark doesn't just materialize out of nowhere; it's been lurking around underwater, probably for a long time. But the swimmers on the surface don't notice it until it's too late.

Your asthma episodes are similar to that shark attack (without the bite marks). If you rely only on short-acting inhaled $beta_2$-adrenergic bronchodilators (known as *rescue medications*) to treat your asthma symptoms when they flare up, that's the equivalent of swimming in shark-infested waters, hoping someone rescues you if the creature comes after you.

It's vital to manage your asthma on a consistent, long-term preventive basis and to avoid a crisis-management approach. You can control your asthma; don't let your asthma control you!

Considering other possible diagnoses

REMEMBER

Although asthma causes most recurring episodes of coughing, wheezing, and shortness of breath, other disorders can cause these symptoms in some cases. With infants and children, underlying problems may include

- An upper respiratory disease, such as allergic rhinitis or sinusitis
- A swallowing mechanism problem or the effects of GERD
- Congenital heart disease, often leading to congestive heart failure
- An obstruction of large airways, possibly caused by
  - A foreign object in the trachea or main bronchi, such as a small piece of popcorn your child may have accidentally inhaled.
  - Problems of the *larynx* (the cartilaginous portion of the upper respiratory tract that contains the vocal cords) or with the vocal cords themselves.
  - *Tracheal stenosis* is an abnormal narrowing of the trachea (windpipe) that restricts your ability to breathe normally. This condition is sometimes referred to as *subglottic stenosis*.
  - Benign or malignant tumors or enlarged lymph nodes.
- An obstruction of the small airways, as a result of
  - Cystic fibrosis.
  - Abnormal development of the bronchi and lungs.
  - Viral infection of the *bronchioles* (small bronchi).

With adult cases, underlying problems may include

- Chronic bronchitis and/or emphysema, collectively referred to as *chronic obstructive pulmonary disease* (COPD)
- *Pulmonary embolism* (a blood clot, air bubble, bacteria mass, or other mass that can clog a blood vessel)
- Heart disease
- Problems of the vocal cords or the larynx (vocal cord dysfunction)
- Benign or malignant tumors in the airways
- A cough reaction due to drugs that you may be using to treat other conditions, such as ACE inhibitors for hypertension
- In addition, a variety of conditions can be confused with asthma, such as fibrotic lung disease, sarcoid and eosinophilic alveolitis.

Classifying asthma severity

If your doctor diagnoses you with asthma based on your medical history, a physical exam, and appropriate tests, studies, and assessments, they also need to define your condition's severity. Physicians classify asthma — whether it's allergic or nonallergic — according to four levels of severity.

Experts from different fields of medicine have developed these severity classifications, which provide the basis for *stepwise management* of asthma. We explain stepwise management and asthma severity levels in detail in Chapter 5.

Consulting a specialist for diagnosis

REMEMBER

To diagnose your condition, you or your physician should consider consulting an asthma specialist, such as an allergist or *pulmonologist* (lung doctor), when

- Your diagnosis is difficult to establish.
- Your diagnosis requires specialized testing, such as allergy testing (see Chapter 11), bronchoprovocation (see the section "Testing your lungs," earlier in this chapter), or *bronchoscopy* (an exam of the interior of your bronchi using a slender, flexible fiber-optic bronchoscope).
- Your doctor advises you to consider allergy shots (see Chapter 11).
- Other conditions, such as sinusitis, nasal polyps, severe rhinitis, GERD, COPD, vocal cord problems, or *aspergillosis* (a fungal infection that can affect the lungs), complicate your condition or diagnosis.
- You don't seem to be doing as well as you'd like.
- You aren't able to regularly sleep through the night without being awakened by your asthma.
- You can't exercise as you'd like to because of asthma.
- You need to use an asthma inhaler for quick relief on a daily basis or in the middle of the night.
- You've experienced a previous emergency room visit or hospitalization for asthma (see Chapter 5) or anaphylaxis (see the section "Food allergies and food-induced anaphylaxis," earlier in this chapter).

Managing Asthma Effectively

"Where do I begin?" That's a question many people with asthma ask themselves. For some people, the question may come up as soon as they receive their diagnosis. For other people, the question may arise after they notice complications of their asthma. Still others may face that question as they care for a loved one living with asthma. It's not easy to know how to start taking care of yourself and managing your asthma. After all, the diagnosis may have been a total shock, and you may not have a clue about how asthma will affect your life.

Stay tuned, because we're here to help you figure out how to begin taking better care of yourself. In this section, you discover why it's important to take care of your asthma daily and for years to come. You also find out about the basics of managing your disease. You're the person who will be responsible for making healthy choices each day. You'll make choices about food, exercise, medications, and even seeing your doctor. So, it's time to get started!

Asthma self-management/asthma action plan

You may have heard the terms *asthma self-management plan* or *asthma action plan*. Both terms refer to how you take care of or manage your asthma. Your plan is based on your goals. It's vital to understand that asthma management is no small endeavor. You're the person most responsible for taking care of your asthma 24 hours a day, 7 days a week, 365 days a year. It's ultimately up to you — not your asthma educator or your doctor or even your spouse — to carry the torch. You can take comfort in knowing that many people just like you are figuring out how to manage their asthma, take new medications, and change the way they breathe.

Taking care of yourself

Making yourself a top priority is one of the best ways to manage asthma. After all, only you can truly manage your disease! It's not your doctor, or your mom, or your spouse who is dealing with asthma every day. It's you. Start taking care of your asthma so you can feel better most days.

Perhaps leading up to your diagnosis you didn't feel so great. You may have experienced symptoms such as shortness of breath or coughing during sleep. Perhaps you were irritable, or out of sorts more than usual. In some ways, it may have felt like a relief to discover a cause for these issues. In other ways, it may have felt scary to find out that asthma was the diagnosis.

The good news is, you can feel great living with asthma most of the time. Even if every day isn't a home run, most of the time you can live your life to the fullest. That's because taking care of yourself and managing asthma can positively impact your daily life. Exercise, in and of itself, is a mood booster. It can reduce stress, lessen symptoms of depression, and release those amazing brain chemicals, known as *endorphins*, that make you feel better. So even if you think exercising to help your asthma may be difficult, you'll have the bonus effect of improving your mood daily.

FAMOUS FOLKS WITH ASTHMA

Rarely do you think of famous figures such as Augustus Caesar, Ludwig van Beethoven, and Charles Dickens in the same breath — unless you're considering the many great achievers throughout human history who had asthma.

The modern world also abounds with asthmatics who have had a significant impact on society, including David Beckham, Jackie Joyner-Kersee, Kenny G, and Liza Minnelli, to name only a few. Being diagnosed with asthma doesn't mean you're sentenced to living on the sidelines.

Renowned leaders, writers, musicians, doctors, and athletes have overcome their asthma to achieve greatness — in some cases, long before the development of the medications and therapies that help today's asthmatics. As we explain throughout this book, you can control your asthma; don't let your asthma control you.

Imagine Dickens, coughing deeply and incessantly while trying to finish *David Copperfield,* or Beethoven suffering from attacks of *dyspnea* (shortness of breath) and wondering whether he was fated to die from a respiratory disease as his mother did. These brilliant creative spirits persevered, fighting past their conditions, and created transcendent literature and music that still speaks to people today.

Perhaps you're a budding Beethoven, a youthful Jackie Joyner-Kersee, or an up-and-coming Jessica Alba. You can accomplish your dreams and hopes for the future, despite having asthma — especially if you and your doctor ensure that you receive the necessary treatment to manage your condition appropriately and effectively. Here are ten examples of important artists, athletes, and leaders who overcame their asthma to achieve great things.

Jessica Alba

The actor and entrepreneur has suffered from asthma since childhood. She's spoken openly about the challenges she faced overcoming asthma, describing herself as a

"sickly kid" in an interview with *SELF* magazine: "I had really bad asthma and was in the hospital a lot from the ages of 4 to 12. My asthma and allergies were so severe, my throat would close up. I often had pneumonia. I even had a collapsed lung."

Steve Allen

The multifaceted American television and radio personality, musician, composer, actor, comedian, writer, and all-around Renaissance Man overcame debilitating asthma attacks in his younger years to achieve national fame as the co-creator and first host of *The Tonight Show*. In his later years, he reported that "asthma doesn't seem to bother me anymore unless I'm around cigars or dogs. The thing that would bother me most would be a dog smoking a cigar."

David Beckham

The world-renowned soccer star wasn't initially public about his asthma. He was only outed after being photographed using an inhaler at the 2009 MLS Cup, when he played for the LA Galaxy. After the game, Beckham said he's had asthma for years but felt no need to discuss it. "I have good days and bad days," Beckham said, according to *The Telegraph*. "I hope it turns into a positive because I've been able to play for many years with the condition."

Jerome Bettis

The former Pittsburgh Steeler and Super Bowl champion was diagnosed with asthma when he was 15 years old. In an interview with *USA Today,* Bettis said he was worried he'd never be able to play sports again. His parents encouraged him to stick with his doctor's treatment plan so he could be as active as he wanted. In 1997, he had an asthma attack during a nationally televised Steelers game, which was his "most frightening experience." But that day served as a wake-up call for Bettis. "Since that day, I've learned to treat my adversary with respect," he said. "And the good news is that once I did, I found I had my opponent under control."

Bono

The iconic Irish singer-songwriter, activist, and philanthropist, mainly known as the lead singer and primary lyricist of the rock band U2, has dealt with asthma most of his life. His son Elijah Hewson also has the condition, and because of his use of inhalers onstage, his own band wound up calling itself Inhaler.

Charles Dickens

The English writer and social critic overcame asthma to create some of the world's best-known fictional characters and is widely regarded as the greatest novelist of the Victorian era.

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John F. Kennedy

From his early childhood, Kennedy (1917–1963) was prone to disease, including asthma. His medical history also included childhood scarlet fever and diphtheria; adolescent afflictions such as bronchitis, sinusitis (see Chapter 10), and an irritable colon; hepatitis in college; malaria during World War II; and struggles with hypothyroidism, ulcers, and urinary tract infections later in life.

In addition to these ailments, *atopy* (a genetic predisposition to developing allergic conditions), which ran in the Kennedy family, showed up throughout his life in the form of food allergies and (most significant) allergic reactions to animal dander, particularly dog hair and horsehair. These reactions often triggered asthma episodes, which plagued Kennedy throughout his life.

But JFK was remarkably resilient, fighting through his many health obstacles to become a U.S. senator from Massachusetts and, in 1960, the youngest elected president in U.S. history. Kennedy contended with his allergies, the related asthma attacks, and the laryngitis that occasionally followed during his years in public office. Not until he was in the White House was he able to appreciably reduce his sensitivities to animal dander — thanks to a long course of allergy shots (see Chapter 11) that his allergist, Paul F. de Gara (1903–1991), administered. Because Kennedy also suffered from Addison's disease, a condition marked by insufficient adrenal function, he required cortisone to boost his adrenal levels. This cortisone therapy may have helped control his asthma, reducing the underlying airway inflammation (see Chapter 13).

Jackie Joyner-Kersee

While a basketball and track athlete at UCLA, future Olympian Jackie Joyner-Kersee was diagnosed with severe asthma. Afraid that her condition would affect her athletic standing, she kept the diagnosis from her coaches.

In an interview with website MedlinePlus, Joyner-Kersee said, "I was always told as a young girl that if you had asthma, there was no way you could run, jump, or do the things I was doing athletically. So, I just knew it was impossible for me to have it. It took me a while to accept that I was asthmatic. It took me a while to even start taking my medication properly, to do the things that the doctor was asking me to do. I just didn't want to believe that I was an asthmatic. But once I stopped living in denial, I got my asthma under control, and I realized that it is a disease that can be controlled."

Joyner-Kersee went on to win six Olympic medals, including three gold, one silver, and two bronze. She was later named *Sports Illustrated*'s Greatest Female Athlete of the 20th Century — all while living with asthma.

Pink

Despite suffering from asthma since she was two years old, the American vocalist, songwriter, actress, and dancer persevered as a singer by learning to vocalize from her abdomen rather than her lungs.

Theodore Roosevelt

Roosevelt (1858–1919) lived with asthma from infancy but overcame the disease in a big way, becoming a prolific author, military hero, and, at age 42, the 26th president of the United States. Perhaps more important for children, he also provided the inspiration for the teddy bear.

Roosevelt did everything in a big way: Throughout his childhood, he dealt with numerous diseases, bad eyesight, and unsuccessful asthma remedies. But a course of vigorous exercise, which TR, as he was also known, began at age 12, eventually helped lessen his attacks. (See Chapter 15 for more information on how exercise can help youngsters with asthma.)

Roosevelt's positive outlook on life, despite the many challenges facing him, also kept him from turning his asthma into an excuse for spiraling into self-pity or losing his wry sense of humor. Referring to one asthma episode, the 15-year-old wrote, "Except for the fact that I cannot speak, without blowing like an abridged edition of a hippopotamus, it does not inconvenience me much."

IN THIS CHAPTER

- Finding doctors and certified asthma educators to partner with
- Getting support from other healthcare professionals, family, and friends

Chapter 2
Building Your Healthcare Team

Seeing a doctor, whether they're an asthma specialist or your own family practitioner, is something to take seriously. You and your physician are partners in treating your medical condition. In this chapter, we discuss one of the most important aspects of effectively managing and treating your asthma or any other serious ailment: developing and maintaining that partnership.

Choosing the Right Provider for You

If you decide to see a clinician who specializes in asthma care in addition to using your primary care provider (PCP), put some time and energy into choosing someone who is the right fit for you. After all, you will likely be seeing this person at least a couple times a year, possibly for the rest of your life. Do your homework by looking into their education, medical certification, experience, and insurance acceptance. Many specialists and clinical offices have websites where you can find out these details before making an appointment. The website may include a short bio or photograph of the provider and a description of the practice.

Immune system issues are likely contributing to many of your asthma symptoms. A board-certified allergist has the training and expertise to assess, diagnose, and treat the underlying immune problem and your lung symptoms. According to the ACAAI, you should see an allergist if your asthma and allergies are adversely affecting your daily activities and decreasing the quality of your life.

A *pulmonologist* is a lung doctor who specializes in conditions like severe asthma, chronic obstructive pulmonary disease, and more. A board-certified pulmonologist has the training and expertise to diagnose and treat your asthma symptoms.

If you know other people with asthma, ask them if they like their specialists/clinicians. Doctors can also be good sources of information about asthma care providers. Find out if your PCP can recommend an asthma specialist in the area.

TIP

Here are some questions to ask about the physician's education and experience:

- Where did the doctor go to medical school?
- Is the specialist board-certified in allergy and immunology or pulmonology?
- Does the clinician have professional memberships in associations like the American College of Allergy, Asthma & Immunology, American Academy of Allergy, Asthma & Immunology, American College of Chest Physicians, or the American Thoracic Society?
- Does the doctor treat a lot of people with asthma?

It's also important to think about the logistics of care and the demeanor of a potential asthma care provider. Find out the answers to questions such as:

- Is it easy to schedule a same-day appointment in case of urgent needs?
- Can you get in touch with the provider after hours if necessary?
- Does the provider offer telehealth visits?

You may need to schedule a preliminary interview with the specialist/clinician to get answers to these questions, or you may be able to ask them during your first office visit. During your initial call, ask if the office is accepting new patients and if they have a new patient packet or an opportunity to ask preliminary questions. Keep in mind that a doctor may charge a fee for this type of visit.

REMEMBER

Don't be afraid to make a list of questions ahead of time and bring them with you. Write down the answers so you remember them. Here's a list to get started:

- How often should I expect to see you?
- Which exams or tests are done during each visit?
- Who covers for you when you are out of the office?
- How does your office handle emergencies?
- Who can I expect to talk to?
- Can I schedule a same-day appointment for urgent needs?
- Do you work with a certified asthma educator or other specialists to coordinate my care?
- Can I call or email with questions?
- How do you prefer to communicate with your patients?
- How would you describe your communication style?
- Does your office have nurse practitioners?
- Do you admit your patients to the hospital and treat them or send them to another doctor for hospital care?
- If I am admitted to the hospital by another physician, will you visit me if asked by that physician?

After your first visit, take time to reflect on the meeting. Consider whether you felt comfortable with the specialist. You want someone with whom you're at ease sharing your feelings or concerns. The provider should also be willing to work with you toward your specific goals. Part of that willingness is an ability to listen well.

TIP

Don't forget to consider the location of the specialist's office and how convenient it will be to make appointments. For example, if the nearest pulmonologist is more than an hour away, you may opt instead to see a PCP who can coordinate your asthma care with your specialist.

Paying for your care

Here's the fun part: dealing with your medical bills. As you're selecting an asthma care provider, keep a few things in mind, such as health insurance coverage and convenience.

Make sure your doctor is covered under your health insurance plan by calling the phone number listed on your card. You can also check online for a list of covered asthma specialists in your area. Read and understand your provider's financial policy before your first visit so you know and are prepared for any necessary out-of-pocket payments.

REMEMBER

The terms of financial policies usually depend on the level and type of health insurance you carry. If you're covered by Medicare or a contracted insurance plan, such as a health maintenance organization (HMO), you generally aren't billed, although you may need to make a small co-payment at the time of your visit.

However, you may need to pay out of pocket for your first office visit (at the time of your appointment) if any of the following applies to you:

- You don't carry health insurance.
- You have a private health insurance policy.
- You aren't covered by an insurance plan, such as an HMO, that contracts with your doctor's practice.
- You can't (or don't) provide your doctor's office with insurance information. (Make sure you have all requested healthcare documents and records with you when you see your physician.)

Dealing with insurance issues

AUTHOR SAYS

With the movement toward managed care, seeing a specialist is frequently more difficult for patients. Having a first-rate health insurance policy, one that provides full access to the physicians you need to see, when you need to see them, is preferable. If you have the opportunity to choose among several medical coverage plans, paying a little bit more for a policy that allows direct access to specialists when you need them is well worth the extra investment. (Just like in most other purchases, you get what you pay for!)

We strongly advise patients not to shortchange themselves by buying insurance solely based on price. A low-cost plan may work just fine when you're in good health and don't really require much specialty medical care. However, if you develop a serious medical problem, you may find that many low-cost plans cover expert treatment only after your ailment deteriorates into a potentially irreversible or life-threatening condition.

Adding a certified asthma educator

A certified asthma educator (CAE) is the other key player on your healthcare team. In fact, this person can really tell you about asthma: what it is and how you can manage it daily. When you are first diagnosed, your doctor may refer you to a CAE or an asthma education class taught by a CAE.

A CAE is your go-to person for education and management questions. Their goal is to support you to make managing asthma easier in your everyday life. They get to know you, answer your questions, and help you troubleshoot problems. A CAE is the health professional whose job it is to help you take your medications properly, remove triggers that can make asthma worse, and stay physically active.

An asthma educator can be a registered nurse, pharmacist, nurse practitioner/physician assistant, or registered respiratory therapist with additional training to educate and care for people with asthma. A CAE has received credentials from the National Asthma Educator Certification Board by passing an exam and logging a certain number of hours caring for patients with asthma. Look for the credential AE-C when choosing an asthma educator.

Working with Other Key Members of the Team

It takes two (at least) to treat asthma. You and your physician — as well as your other healthcare providers — are partners in controlling your asthma. Other members of your asthma partnership can include nurses, pharmacists, and any health professionals who treat you or assist you in understanding and finding out more about effectively managing your condition.

AUTHOR SAYS

If you have asthma, your family also — in a sense — has the condition. Asthma isn't contagious; rather, your family also has the condition because you all may need to deal with the various issues associated with your medical condition's treatment. In fact, studies show that family support can be a major positive factor in the success of any asthma treatment plan. Particularly important to your asthma treatment is making sure that the people you live with (as well as coworkers, fellow students, or anyone you're around much of the time) help you reduce your exposure to asthma triggers and to precipitating factors. In Chapter 6, we explain in detail the most common triggers and precipitating factors to avoid.

If your child has asthma, you should also be a partner with your child's doctor and other medical professionals in the management of their condition. (Chapter 15 provides details on managing asthma in children.)

Aside from your personal network, the following people are valuable members of your healthcare team:

- **Pharmacist:** You may think of your pharmacist as the person behind the counter counting your pills or refilling your medications. Your pharmacist, however, is much more than that. They are an expert on medications: dosages, uses, and how drugs work. This person is a key member of your healthcare team.
- **School nurse:** School nursing is a specialized practice of professional nursing that advances the well-being, academic success, and lifelong achievement of students. School nurses facilitate positive student responses to normal development; promote health and safety; intervene with actual and potential health problems; provide case management services; and actively collaborate with others to build student and family capacity for adaptation, self-management, self-advocacy, and learning.
- **Respiratory therapist:** A respiratory therapist is a health professional who helps you breathe better. They work directly with you to assess your health and come up with a plan that fits your goals. This key member of your healthcare team will often conduct *spirometry* (lung function tests), administer medications, and support you if a hospital stay is needed.
- **Nurse practitioner:** You can find nurse practitioners (NPs) in primary and specialty care. An NP may be at the center of your asthma care team. NPs can make diagnoses, prescribe medications, order lab tests, and develop an asthma management plan. They have advanced clinical training beyond a registered nurse, so look for people with the credentials NP.
- **Physician assistant:** Physician assistants (PAs) can be PCPs. They diagnose and treat patients and prescribe medicines. Their roles vary depending on the healthcare setting, their experience, and their specialty. Some PAs have specialized training in treating people with asthma.
- **Mental health specialist:** Your mental and emotional health are just as important as your physical health. In fact, the two are closely related. Living with a chronic condition such as asthma can be exhausting and annoying. It can even lead to anxiety or depression. You shouldn't be afraid to bring up these issues even if your doctor doesn't ask about them. We discuss this further in Chapter 9.

  Mental health specialists are trained to help you cope with overwhelming thoughts and emotions. There are a wide range of specialists, so consider your needs and the cost of each. Here is an overview:

  - A *psychiatrist* is a medical doctor who can prescribe medications and other treatments and offer therapy.

- A *clinical psychologist* has a master's or doctoral degree and is licensed by their state to help people with depression, anxiety, or other mental health problems. They may offer individual, group, or family sessions.
- A *marriage* or *family therapist* has a master's or doctoral degree in mental health and special training to help married couples or families going through stressful periods.
- A *social worker* has a master's degree and works across a broad range of situations, including workplace stress and family or marital problems, identifying resources in the community for those who need help.

REMEMBER

Keep in mind that not all health insurance plans cover mental health care. Ask your asthma care provider for a referral or recommendation as needed.

IN THIS CHAPTER

- Getting ready to meet with the doctor
- Getting lung and blood tests
- Evaluating symptoms with quizzes
- Asking your doctor questions
- Preparing a checkup checklist

Chapter 3

Making the Most of Your Doctor Visits

Seeing a doctor, whether they're an asthma specialist or your primary care provider (PCP), is critical. You and your provider are partners in treating your asthma. Developing and maintaining that partnership is one of the most important aspects of effectively managing and treating your asthma.

Checkups with your asthma care provider are a wonderful opportunity to discuss your goals and measure your progress. These appointments are also critical for evaluating your lung health and assessing any other problems that may have arisen. In this chapter, we will tell you what to expect during office visits and what to bring with you. You'll learn about the physical exams and lab tests typical for people living with asthma. You'll also find out about single-dose (pneumonia) vaccinations and yearly (influenza) vaccines that can minimize infectious triggers of your asthma and keep you healthy throughout the year (see Chapter 4).

It's important to communicate well with your provider, so we also offer tips on the best ways to make sure your concerns are heard and your questions are answered.

Preparing for Your First Visit

The effectiveness of your treatment depends not so much on the length of time you spend in your doctor's office, but rather on the quality of that time. In our experience, patients who derive the greatest benefit from treatment are those who understand how to get the most out of their doctor visits. Some tips for getting the most out of your doctor visits include

- Prepare ahead of time by making a short list of the concerns that you'd like to have addressed at your visit and contacting a family member or friend who might be able to accompany you to the visit. If you're not fluent in English, you should also consider making an advance request to have an interpreter at the appointment.
- Communicate clearly with your doctor about your condition and your treatment.
- Understand all aspects of your treatment plan, including the medications your doctor prescribes, and determine the most effective ways of avoiding asthma and allergy triggers (see Chapter 6 for details on this topic).
- Participate in developing treatment goals with your doctor. One of the most important questions you should be prepared to answer is what your individual goals for managing your asthma are. For some, it may be the ability to exercise without shortness of breath, while others may simply want to stay out of the ER or hospital or to sleep through the night without coughing.
- Adhere to your treatment plan. You're the most important factor in your own treatment process. Your good health and your quality of life clearly depend on your full and active participation in the treatment process.

When you make your appointment, ask your asthma care provider, nurse, or office personnel what to bring with you. Although every doctor's office is a little different, bringing a list of your current medications is often recommended.

You may find it easiest to put all your medications in a bag and bring them with you to the visit. Or you can use your smartphone to take photos of your medications. This will ensure everything is recorded correctly in your chart.

You may want to use a notebook or a notes tab on your phone to record questions to ask your doctor. Be sure to bring a pen or pencil to jot down responses to your questions or tips for finding more information as you manage your disease over the long term. Here's a checklist of what you should bring with you:

- Medications
- Questions for provider
- Pen/pencil and notepad or smartphone to record answers

Doing Your Homework

You have a lot to remember for each visit with your healthcare provider. Try to prepare and plan ahead so your visits go well. In the following sections, we outline what to expect so you can get the most out of your appointments.

Filling out forms ahead of time

Many doctors send patients a questionnaire to fill out prior to their initial consultation. The level of detail these questionnaires require varies, depending on the symptoms you experience and the type of consultation you seek. Doctors don't send out these forms because they love paperwork; rather, they want to ensure that your appointment is productive.

TIP

In most cases, you can expect to spend between one and two hours at your first appointment. You may have a hectic life, but it's important to plan your schedule so that you can arrive at your physician's office 10–15 minutes before your scheduled appointment so the nurse will have ample time to check you in prior to seeing the doctor. Remember to bring all requested forms, documents, and other materials, including your insurance and other payment information. (See Chapter 2 for more information about paying for your care.)

PATIENT, KNOW THYSELF

Providing your doctor with the information they request about your medical history enables you to take part in the process of diagnosing and treating your medical problems. While assembling their medical histories and related details, many patients have discovered patterns and connections between symptoms, triggers, and environmental factors (for example, a sudden change in the weather, usually from hot to cold) that they hadn't realized before.

Gaining this type of self-knowledge not only helps your physician make a diagnosis but can also help you make more informed choices about your treatment options, as well as assist you in avoiding the triggers and aggravating factors of your asthma symptoms.

Telling your story

Whether it's gathered through pre-appointment forms or during an in-office interview, you probably need to provide the following information at your first appointment with your asthma and allergy specialist:

- Your name, address, telephone number, and other contact information.
- Your age, gender, marital status, and information about family members living with you. (If you're making an appointment for your child, list your own and your spouse's age and the age of any other children in your household.)
- The name of your referring physician (or another person who referred you).
- The major medical problems that affect you and their duration.
- The symptoms you're experiencing and the specific areas or organs of your body that are affected. Providing details of when and in what circumstances these symptoms occur is often vital to establishing an accurate diagnosis.
- Your current pregnancy status or plans to become pregnant.
- Aggravating factors that seem to make your condition worse. For example, if you notice that your respiratory symptoms — such as coughing, wheezing, or shortness of breath — are more severe when you visit people who have pets or when you're around smokers, make sure you tell your physician.
- The names of all the medications you're currently taking, including products you use specifically for your condition, prescriptions you have for other conditions, and over-the-counter (OTC) preparations or herbal remedies you take to relieve minor aches and pains. Because gathering this information all at once can be a challenge, it's usually best to keep a drug record you can refer to when consulting with a new doctor, as we explain in "Recording your symptoms and medications," later in this chapter.
- If you've been treated or evaluated previously for the same condition, provide your new doctor with information on the results of these consultations and treatments. (Bringing the results from any tests you've had in the past may also save you the trouble — and cost — of repeating those procedures.)
- Other illnesses and related treatments you've had. These details are vital to evaluating your current condition.
- Your family history. This information is very important in determining your diagnosis, so take time to list your family history to the best of your ability (see "Taking your family history," later in this chapter). Likewise, if you fill out the form for a child, provide information on specific childhood factors, such as birth history, immunizations, and childhood illnesses (for example, *bronchiolitis* [inflammation of the small airways in the lungs] and/or croup).

- Your occupation, employment, school you attend (or day care, for children), and hobbies or recreational activities.
- Your dietary history, including any special diets you follow, major food groups you avoid, and whether you've been diagnosed with any food allergies. (Check out Chapter 8 to discover why people with asthma should be aware of food allergies.)

Also, doctors aren't census takers (or private detectives, for that matter), but your specialist needs to know about your home because many things in your domestic environment, particularly dust, animal dander, mold, and tobacco smoke, can trigger or aggravate asthma or allergy symptoms. Therefore, provide your doctor with the following information:

- A list of the people living with you and any habits they have that can affect your condition, such as smoking or keeping pets.
- A list of any plants you have and where in your home they're located.
- Details about your home, including its location, age, principal construction materials, air circulation system, the condition of the basement, and the type of carpets and furnishings you have. Your doctor may also ask about your yard, garden, and surrounding vegetation.
- Details about your bedroom, including what the ventilation's like and whether it's a dust mite breeding ground (dust mites grow best in high humidity environments; see Chapters 6 and 7). You most likely spend the majority of your life in your bedroom, so exposure to allergens (such as dust mites) in your bedroom can often play a significant role in the severity of your asthma or allergy symptoms.

Recording your symptoms and medications

Keeping a daily symptom diary can provide valuable information that your physician can use when assessing your condition. A typical daily symptom diary is usually a table with columns and rows where you can record data such as your daily symptoms, medications you take, your *peak expiratory flow rate* (a measurement of lung function used to monitor asthma; see Chapter 1), and your observations about possible triggers or suspected exposures.

In addition to keeping a symptom diary, we recommend establishing a medication record that lists all the drugs — prescription, OTC, and herbal remedies — that you are taking. Recording your medications is similar to keeping an appointment schedule.

Your medication record should include the brand and generic names of all drugs you've used and currently take, including OTC vitamins and supplements — some of which are as potent as the conventional medical products that the Food and Drug Administration regulates by prescription. In addition, note the conditions you treat or have treated with particular drugs and the effectiveness or results of taking those products.

TIP

If you're unsure of the actual drugs you use (perhaps the label is difficult to decipher), bring the medication with you in its original container. Also, ask your pharmacist, PCP, or other doctors for a list of medications they've prescribed for any of your medical conditions.

Knowing your family history

Because heredity often plays an important role in determining your likelihood of developing asthma or allergies, your physician usually asks about your family medical history. You don't need to become a professional genealogist to research this information, but you should make sure you know which relative (mother, brother, uncle, and so on) had a particular disease or condition. Letting your doctor know whether your parents, siblings, or close relatives have had asthma, or allergic conditions such as *allergic rhinitis* (hay fever), *atopic dermatitis* (eczema), and food or drug allergies, is especially important.

In addition, because other medical conditions that run in families can influence your treatment, your physician needs to know whether any of your family members suffer from (or had) illnesses such as diabetes, high blood pressure, heart disease, cystic fibrosis, and cancer.

Using Lung and Blood Tests to Diagnose Asthma

TECHNICAL STUFF

The first step to getting effective treatment is to have your condition diagnosed. Several lung and blood tests can be used to diagnose and monitor your asthma. In the following sections, we outline the ones that are often administered.

Spirometry

If your symptoms include coughing, wheezing, and shortness of breath, your doctor should assess your lung functions with spirometry to evaluate whether asthma is the underlying cause of your symptoms. A *spirometer* is a medical device

that measures airflow from your large and small airways before and after you inhale a quick-relief medication.

For adults and kids older than 5, spirometry provides the most accurate way of determining whether airway obstruction exists and if your condition gets better after taking medication. Doctors may advise additional lung tests if they suspect other conditions may be causing or affecting patients' symptoms (see Chapter 10).

Fractional exhaled nitric oxide

High fractional exhaled nitric oxide (FeNO) levels indicate your airways are inflamed or irritated. For this reason, FeNO testing is a valuable tool in screening for asthma.

FeNO tests are performed at a doctor's office. The FeNO measurement device is attached to a tube with a mouthpiece at the end. You breathe through the mouthpiece, exhaling slowly and steadily, and the device measures the amount of FeNO you exhale. You often repeat this test a few times, but it should take less than five minutes.

While an elevated FeNO test doesn't confirm a diagnosis of asthma, it does indicate that you may be experiencing airway inflammation or irritation. This, along with your medical history, physical exam, and other tests, should help your doctor determine if you have asthma.

Blood eosinophils

Your physician may look for an elevated count of *eosinophils* (a type of white blood cells associated with inflammation) in your bloodstream. This may indicate an allergic condition, and the blood test may help in distinguishing asthma from other respiratory conditions that can also present with shortness of breath or coughing.

Specific IgE and total IgE

Your provider may recommend using a blood test for diagnosing allergic sensitivities and their connection to your asthma symptoms. This method may not be as precise as skin testing for allergies but is often used in primary care settings or when skin testing cannot be done.

Your provider may also recommend a blood test that shows your total IgE (immunoglobulin E), which is an antibody that is elevated in patients with allergies. This test determines if an allergy may be playing a role in your asthma symptoms. In addition, specific IgE blood testing may also be done to identify the actual allergens that are triggering your symptoms.

Taking Symptom Quizzes

Asthma is a chronic disease of the airways, but symptoms of the condition can be managed and treated through a combination of medication and lifestyle changes. Two easy ways to check if your asthma is under control are an asthma control test (ACT) and the Asthma Impairment and Risk Questionnaire (AIRQ), which are filled out by the patient at the appointment prior to seeing the doctor.

Asthma control test

An ACT assesses the frequency of shortness of breath and general asthma symptoms, use of rescue medications, effect of asthma on daily functioning, and overall self-assessment of asthma control. After completing the ACT, you should discuss your responses to each of the individual questions, your total score, and your level of asthma control with your healthcare provider to form a treatment plan.

AIRQ

The AIRQ is an assessment tool intended to help identify patients 12 years of age and older whose health may be at risk because of uncontrolled asthma. It's based on a series of patient-facing questions about asthma medications, respiratory symptoms, and utilization of healthcare resources. Depending on your responses to these questions, you receive a score reflecting your level of asthma control.

After completing the AIRQ, you should discuss your responses to each of the individual questions, your total AIRQ score, and your level of asthma control with your healthcare provider to form a treatment plan.

Making Time for Questions

You need to cover a lot during your first doctor visit. All the tests and components that we've explained here are vital for your asthma care. Make sure there's time to have your questions answered at the beginning or end of the checkup. It may

help to write down your questions ahead of time and then ask your provider when is the best time during the visit to discuss those matters.

AUTHOR SAYS

Communication is incredibly important when you're working with your health-care team. Check that all your providers have one another's names, phone numbers, and email addresses so they can share your health records or connect as needed. Make sure all providers know when you change your medications or other treatments. It's also helpful to share any major lifestyle changes like quitting smoking or living in a new home.

Your team is there to support you, so don't be shy when you have questions or concerns. Feel free to take the initiative and ask how each provider prefers to be communicated with — email, phone call, nurse contact, telehealth appointment, or some other way. Every office is different, so ask ahead of time about the best way to communicate.

Here are a few things you can do that may make you more comfortable as you share your concerns and questions with your asthma care provider:

- Bring your symptom logbook or mobile app.
- Write down your questions ahead of time and bring them with you.
- Start by sharing what you hope to accomplish during the visit and ask your provider to do the same.
- If you don't understand something, ask again. Asthma is a complex chronic condition with many moving parts. It's totally normal not to understand everything all at once, and you should be comfortable asking for clarification.
- Don't forget a pen or smartphone for writing down or recording your doctor's instructions! Write down your doctor's instructions as you go. Doctors won't be offended by this; they'll be encouraged by realizing that you're really listening and taking their instructions seriously.

REMEMBER

One of the most important steps you can take is to set goals related to managing your asthma. Talk about specific action steps you can take to achieve those goals.

Another important step is measuring your progress toward your goals. You need to know how to measure any improvements in your daily life, especially since you're the one living with asthma 365 days a year, not just during the time spent in your provider's office. Keeping a logbook or recording data on a mobile app may make it easier to follow the progress you're making. This will help you stay on track and celebrate your success!

Using an Annual Checkup Checklist

Here's a short checklist of what should be covered in an annual visit. You can keep this list with you when you go to an appointment to ensure that all these topics are addressed:

- Height and weight
- Pulse/respiration
- Blood pressure
- Goals for asthma care
- Medications (both old and new)
- Review of inhaler technique
- Blood tests
- Lung tests
- Symptom quizzes

IN THIS CHAPTER

- Defining asthma education
- Understanding self-care
- Staying active with asthma
- Keeping in touch with your doctor
- Considering personalized therapies

Chapter 4
Living Well with Asthma

Living well with asthma is a realistic goal, and it's one that your asthma care provider and healthcare team should help you achieve. We discuss the specifics of developing an asthma management plan with your doctor in Chapter 5, but in this chapter, we get you started on effectively managing your asthma for the long term by discussing lifestyle changes that will have a beneficial effect on your asthma and allergy symptoms.

First, we explain what asthma education is and why it's so important for asthma patients to better understand their condition and keep improving their skills at managing their condition. Then we discuss why maintaining an effective exercise routine, eating right, taking your medications appropriately, and controlling your asthma triggers will improve respiratory symptoms and your overall health. We also review why it's vital to see your doctor regularly. The final section of the chapter addresses personalized asthma therapies, which represent the newest and most effective approach to the management of chronic conditions such as asthma.

Understanding Asthma Education

AUTHOR SAYS

An asthma education class may be your first real opportunity to find out more about what asthma is and how it affects your body. When you're first diagnosed, you may feel disbelief, shock, or dread. You may feel overwhelmed, which may discourage you from asking questions or finding out much about asthma. This is totally natural.

Don't beat yourself up. You have many opportunities to educate yourself and ask questions during asthma education sessions. You can learn all about asthma and how to best care for yourself. Read on to find out more about asthma education, what to expect, and how to find an asthma education class or coach in your area.

REMEMBER

Here are four critical times to take part in asthma education:

- When you are first diagnosed
- During your annual asthma visit
- If you experience any complications like an ER visit or hospital stay
- If you experience any life changes that affect how you care for yourself

AUTHOR SAYS

Right after your initial diagnosis is the most critical time to attend an asthma education session. You will go over the basics of avoiding triggers, taking your medications properly, and preventing symptom flare-ups.

Staying informed about asthma

At the heart of asthma education are coping skills and key behaviors to help you navigate a chronic condition. You don't get a day off when you have asthma, so you need all the tools you can get to live your best life in the days, weeks, and years ahead. Staying informed with asthma education can improve your health. Studies have shown that asthma self-management and education can reduce the impact of asthma on your quality of life and lung function.

Asthma education isn't a one-size-fits-all endeavor because asthma isn't a one-size-fits-all disease. Asthma education should be tailored to your medical history, personal goals, current knowledge, cultural preferences, emotional concerns, financial situation, and physical limits.

Your annual visit with your asthma care provider is one opportunity to enhance your understanding of the disease and reinforce your asthma management skills. Your provider will ask you specific questions about how you're managing your asthma and whether you need help in any specific area. Your provider may refer you to an asthma educator, respiratory therapist, or another specialist to focus on developing new skills or improving behavior patterns.

Asthma education to increase your knowledge and skills for managing asthma during your everyday life can occur in a group or individual setting. As part of asthma education, you should find out more about what makes your asthma worse and how to avoid those things. You also learn how to take your medications properly and practice better breathing techniques.

In addition, you develop coping skills for managing the common emotional concerns that can go along with living with a chronic condition. Don't forget, you can always ask for a referral to a mental health professional if you feel like you need additional support.

How asthma educators can help

When you're first diagnosed with asthma, you may be referred to an asthma education class or session. The class may be taught in the hospital, via telehealth, or in a private practice. Asthma educators are specially trained to help you manage your asthma. They can help you understand what makes your asthma worse, how to take new medications, and how to start getting more physically active to improve your lung health.

Look for an asthma educator who has the AE-C credential. This certification is given to a healthcare professional who has completed a required number of hours in clinical practice and has passed an examination from the National Asthma Educator Certification Board. Your asthma educator will likely be a respiratory therapist, nurse, pharmacist, physician, physician assistant, or nurse practitioner. If you cannot find someone with the AE-C credential, ask your doctor, visit Allergy & Asthma Network (`https://allergyasthmanetwork.org/`), or try one of the trusted resources we list in Chapter 20.

During an asthma education class, you find out what asthma is and how it affects your body. You will probably discuss the topics we touch on in Chapter 1, such as understanding your airways, avoiding triggers, and taking your medications. This is an ideal time to find out about common complications of asthma and how to treat them. Your asthma educator should take the time to discuss how to properly take your medications and address any concerns about potential side effects.

Making sure you're heard

You should discuss your individual concerns and develop personalized goals and a plan for moving forward. It may also be beneficial to include a spouse or loved one who is part of your support system. Another set of eyes and ears can be beneficial as you're learning. An asthma education session shouldn't be a one-and-done experience. Asthma education is part of your ongoing management and support. Your goals and needs change over time, and asthma education and support can help you navigate these changes to cope more effectively and prevent asthma complications.

TIP

Allergy & Asthma Network (https://allergyasthmanetwork.org/) offers free digital asthma education. Short video tutorials about the basics of asthma and a free mobile app are available to help you track symptoms, moods, and medications. The Network also offers a free six-week telehealth coaching course by a certified asthma educator. You can find out more about these topics and services on the website.

Taking Care of Yourself

Have you noticed that most self-care advice involves taking a deep breath? That may seem simple to most people, but it's not always easy if you have asthma. Living with asthma can sometimes feel unpredictable. Taking time to focus on self-care can help you manage your symptoms, take control of your condition, and feel prepared for whatever comes next.

Sleeping well

More than 20 million Americans are affected by *nocturnal asthma* — also called nighttime or sleep-related asthma. When you breathe in, your lungs transport oxygen into your bloodstream, which carries it to the rest of your body. When you breathe out, they transport the waste product — carbon dioxide — out of your bloodstream.

How well this process works varies throughout the day as part of your body's natural *circadian rhythm* — an internal clock that regulates body mechanics over a 24-hour period. Lungs work best during the day, with peak lung function at about 4:00 p.m. Several studies show that 12 hours later — around 4:00 a.m. — lung function is at its lowest. The fluctuation is usually less than 10 percent. However, people with asthma can have up to a 50 percent difference between daytime and nighttime lung function.

In addition to rhythmic fluctuations, factors that contribute to worsening asthma symptoms during sleep include changes in the degree of airway inflammation, the level of exposure to allergens, and the patient's responsiveness to their medications. Because short-acting bronchodilators are only effective during a four- to six-hour period, the medication's effectiveness can wear off while patients are asleep. This can result in asthmatics waking up short of breath because they need to take another dose.

Asthma, GERD, and sleep disturbance

Gastroesophageal reflux disease, or GERD (often called acid reflux or reflux), a backwash of stomach acid into the esophagus, is also a contributing factor to sleep disturbance. Researchers aren't sure exactly how reflux and asthma interact, but they do see a connection. Studies suggest that as many as 75 percent of adults with asthma also have reflux.

Reflux can set off asthma symptoms. Because reflux is more common when a person is lying down, people with asthma may have more breathing difficulties during sleep.

Sleep apnea

Another sleep-related condition that can worsen nighttime asthma is *sleep apnea*. This sleep disorder causes repeated pauses in breathing throughout the night — a serious problem in itself, but also one that can set off or worsen asthma symptoms.

A recent study by Cincinnati Children's Hospital Medical Center showed that women with asthma are twice as likely to have symptoms of sleep apnea as women without asthma.

Allergens and sleep problems

Allergens — such as pollen or mold that causes allergic reactions — can also play a role in sleep problems. Exposure to allergens during the day may set off a chain reaction in the immune system that produces symptoms hours later, as can allergens in the bedroom, like dust mites or animal *dander* (tiny scales that flake off hair or skin).

Studies show that postnasal drip and congestion from allergies can cause multiple nighttime *micro-arousals*. These awakenings are so brief that the sleeper doesn't remember them, but they affect alertness the following day.

Why nocturnal asthma matters

The most obvious signs that asthma is disturbing someone's sleep are fatigue, irritability, and reduced alertness the following day. Other signs to look for include morning headaches, depression, and impaired concentration.

The effects of nighttime asthma and allergy symptoms reach beyond the bedroom. Children with nighttime asthma miss more time from school — and their parents more time from work — than healthy children. School and work performance can suffer when the family can't sleep.

Children whose rest is disturbed by asthma symptoms have a higher incidence of psychological problems and poor school performance. Studies show that these children score lower on memory and time-limited tests.

Understanding allergic fatigue

Doctors use the term *allergic fatigue* to describe the tiredness and general lack of energy that people with nasal allergies experience. This condition is often blamed on antihistamine medications, many of which cause sedation. But recent studies show that, in addition to other factors, poor sleep quality contributes to the exhaustion people with allergies may feel all day long.

Eliminating allergens and potential asthma triggers in the bedroom can make a big difference in your quality of sleep. Allergy testing, combined with your symptom history, will help your doctor determine which allergens are triggering your asthma or allergy symptoms. You can then focus your efforts on eliminating exposure to those specific allergens.

Managing allergy-related sleep problems

TIP

If cleaning up the bedroom isn't enough to curb allergy symptoms, work with an allergist on treatment options, including *immunotherapy* (allergy shots), oral and nasal antihistamines, and nasal corticosteroids. People 12 and older can also be tested to see if they qualify for a medication that reduces the number of antibodies responsible for allergic reactions. Talk to your doctor about nighttime problems. Asthma needs to be controlled both during the day and at night to maximize a patient's health-related quality of life.

If you think your child is having trouble sleeping due to asthma or allergies, monitor their symptoms, encourage them to report any problems to you, and have them keep a sleep journal (this can be part of their daily symptoms diary).

If your child has asthma, and you notice excessive napping or drowsiness, school problems, hyperactivity, or distractibility, ask your doctor to assess your child's nighttime symptoms. Discuss your child's sleep schedule, sleep environment, sleep-related symptoms, and behavioral issues with your physician. You should also carefully monitor your child's use of medication by checking the following:

- Is your child taking all doses on time?
- Is your child adept at using a metered-dose inhaler or nebulizer?

Check your child's inhaler technique at their next medical appointment and talk to the doctor about other medical conditions — such as reflux and sleep apnea — that may be contributing to sleep problems. Asthma and allergies don't have to keep your family from getting the sleep you need. Work with your child's medical care team to determine what's causing sleep problems and how you can solve them.

Dealing with dust mites

With all the mattress and pillow options available today, are some better than others for people with asthma and allergies? It depends on what's causing your sneezing and wheezing.

TIP

If you're allergic to dust mites, the keys to a good night's sleep are using mattress and pillow encasements and monitoring humidity levels. Dust mites need two things to thrive: water (which they absorb from the air) and food (which they get from you in the form of dead skin cells). Keeping your bedroom's humidity below 50 percent will deprive dust mites of their water source, and a special cover over your mattress and pillow will deprive them of food. The mattress and pillow encasements will also protect you from allergens in mite body parts and fecal pellets (poop).

Here's some good news about mattress and pillow encasements: Old-style pillow and mattress encasements were made of plastic; they didn't allow air to flow through, so you'd end up sweaty, and they made a lot of noise when you rolled over. New encasements are made of tightly woven fabric that's soft and silent. Small pores allow air to pass through but are too small for dust mites and allergens to get through. When shopping for encasements, look for bound seams and a pore size (the amount of space between fabric threads) of 10 microns or less. Avoid coatings or lamination that can wear off in the wash.

Also, be aware that new allergy-free and hypoallergenic pillows may not solve your slumber problems. According to the American Academy of Allergy, Asthma & Immunology, both synthetic pillows and feather pillows promote dust mite growth. It turns out that allergy to feathers is actually very rare. So, select the pillow that's most comfortable for you and use a tightly woven pillow encasement.

TIP

Many children and even teenagers have well-loved stuffed animals that are full of dust mites. How do you get rid of those dust mites? You can turn the hot water heater up to 130 degrees Fahrenheit on laundry day. Or you can make your child's stuffed animals "allergy-friendly" by sticking them in the freezer overnight. After the deep freeze, wash and dry the stuffed animals to get rid of dust mite body parts and fecal pellets.

Eating right

It's no secret that a well-balanced diet keeps the body and mind strong and healthy. Eating the right foods and nutrients can give you energy to stay active throughout the day, support your immune system, and improve your health — even your lung health!

The right nutrients in your diet can help you breathe easier and, in some cases, help minimize asthma symptoms. While there's no specific diet recommendation for asthma, some foods and nutrients may help support lung function and reduce asthma symptoms.

How does food impact breathing? *Metabolism* is the process of changing food to fuel in the body. Oxygen is important in this process to help burn the food's nutrient molecules. When sugars, fibers, fats, and proteins are broken down, energy is the final product. Carbon dioxide created as a waste product is exhaled.

Different types of nutrients require different amounts of oxygen and produce different amounts of carbon dioxide. Carbohydrates use more oxygen and produce more carbon dioxide, whereas fats produce less carbon dioxide for the amount of oxygen consumed. Some people feel that eating a diet with fewer carbohydrates and more healthy fats helps them breathe easier.

Understanding how vitamins D and E can help control asthma

Research into the effect of vitamins on asthma and allergy (regardless of whether they're taken as dietary supplements or ingested via foods) is inconclusive, with some studies citing a modest beneficial effect and others citing no benefit.

TIP

Vitamin D plays an important role in boosting immune system responses and helps reduce airway inflammation. Low levels of vitamin D have been linked to increased risk of asthma attacks in children and adults. Research also shows adults with asthma may benefit from vitamin D supplements because of its protective effects against acute respiratory infection and a reduced rate of exacerbations needing treatment with systemic corticosteroids. Food sources of vitamin D include the following:

- Fortified milk
- Salmon
- Orange juice
- Eggs

TIP

Vitamin E contains a chemical compound called *tocopheral*, which may decrease the risk of some asthma symptoms like coughing or wheezing. Food sources of vitamin E include the following:

- Almonds
- Raw seeds
- Swiss chard
- Mustard greens
- Kale
- Broccoli
- Hazelnuts

Avoiding foods that worsen your asthma

While some fresh fruit, such as apples or bananas, can be helpful in your diet, sulfites may still be found in many dried fruits and can cause an adverse reaction or even worsen asthma symptoms in some people. Although declining in frequency, sulfites are also found in these foods:

- Some pickled foods (such as sauerkraut and pickles)
- Shrimp
- Maraschino cherries
- Bottled lemon or lime juice
- Alcohol

TIP

Foods that cause gas or bloating often make breathing more difficult and should therefore be avoided. Reactions to the following types of foods may cause chest tightness and trigger asthma flare-ups:

- Beans
- Carbonated drinks
- Onions
- Garlic
- Fried foods

WHAT ABOUT SOY ISOFLAVONE?

You may have heard of soy isoflavone supplements as a possible remedy for asthma symptoms. A study from the American Lung Association Airways Clinical Research Centers Network has found that use of a soy isoflavone supplement did not result in improved lung function or clinical outcomes, including reduced symptoms and episodes of poor asthma control or airway inflammation.

In rare cases, some people with asthma are sensitive to *salicylates*. These naturally occurring chemical compounds are found in tea, coffee, some herbs and spices, and even aspirin. People with common food allergies or sensitivities to foods such as dairy products, artificial ingredients, peanuts, tree nuts, wheat, or shellfish may also be at risk of developing asthma.

Keep in mind that food restrictions and allergies vary depending on the individual. No single food or vitamin will supply all the nutrients you need. To keep your mind and body healthy, it's vital to maintain a diet with a variety of vitamins and nutrients.

It's important to consult your doctor or a nutritionist before making any drastic changes to your diet. Find out more about nutrition and health at Nutrition.gov and find a registered dietitian nutritionist at EatRight.org.

Taking medications

How well do you understand your (or your child's) asthma medications? Do you know how often they should be taken? How to use an inhaler correctly? Or how the medication can help control symptoms?

AUTHOR SAYS

For many reasons, we feel that both adult asthmatics and parents of children with asthma should know the names of all their medications and be familiar with their actions and potential side effects.

In a recent study, researchers surveyed parents of 740 children with probable persistent asthma and then compared their responses with their doctors' responses. The researchers found nearly half the parents didn't know the classification of their child's medication or how often the medication was to be taken.

Additionally, among parents of children who were prescribed asthma medication, the study found the following:

- Twenty-nine percent didn't understand inhaled corticosteroids.
- Sixteen percent didn't understand a combination of inhaled corticosteroid and long-acting bronchodilator.
- Ten percent didn't understand leukotriene antagonists.
- More than half of parents whose children were supposed to use medicine only during asthma flare-ups didn't follow directions.
- Twenty-seven percent of parents of children on a daily inhaled corticosteroid didn't know their child was supposed to use it every day.

The research suggests greater communication between patients and healthcare professionals is needed.

TIP

Patient education is key to helping patients and parents better understand asthma medications. The National Institutes of Health and the Global Initiative for Asthma have both updated their respective asthma guidelines. Visit `https://allergyasthmanetwork.org/news/how-severe-is-my-asthma/` for information about how asthma severity is classified and explanations of how medications can be an integral part of developing a treatment plan.

Identifying and controlling environmental triggers

Although there's no cure for asthma, it can help to avoid your triggers. An *asthma trigger* is something that causes your asthma to get worse. When you're exposed to it, you can have an asthma attack, flare-up, or episode — a sudden worsening of your asthma symptoms.

REMEMBER

The following list explains some of the most common triggers and how to identify and avoid them:

- **Allergens:** High pollen counts in spring and fall can cause asthma symptoms to flare. Dust mites and pet dander are allergens commonly found inside the home that can worsen asthma. Food and medicine can also cause asthma attacks. For instance, certain foods, aspirin, nonsteroidal anti-inflammatory drugs (known as NSAIDs), and even herbal medicines can cause asthma attacks when people with allergies or sensitivities ingest them. Know your allergens by getting tested and then avoiding the things that cause an allergic reaction. Tell all your healthcare providers your known food and drug allergies.

- **Sudden weather changes:** For some people, dry wind, humidity, cold air, or sudden changes in weather (storms, strong winds, and abrupt temperature changes) can trigger asthma symptoms. High ozone levels and poor air quality can also trigger symptoms. Check the Air Quality Index (AQI) for your location. On days when the AQI is 100 or higher, stay inside in an air-conditioned room if possible.
- **Respiratory infections:** A common cold, the flu or even a sinus infection can make your asthma flare. Infections are common causes of asthma attacks, so wash your hands often and completely, get your flu and COVID vaccines (unless your doctor advises you not to), and avoid people who may be contagious.
- **Smoke and irritants:** Fragrances, cigarette smoke, and other sources of smoke like charcoal grills and outdoor bonfires can trigger asthma. Air pollution also falls into this category. Make a plan to quit smoking. Avoid secondhand tobacco smoke or find ways to limit your exposure if you live with a smoker. Steer clear of campfires, wood-burning fireplaces, and outdoor bonfires if they trigger your symptoms.
- **Animals:** Your furry and feathery friends shed dander and saliva that can trigger your asthma. Common allergenic animals are dogs, cats, hamsters, guinea pigs, rabbits, mice, and ferrets. (There are hypoallergenic breeds of some of these animals.) Make a plan with your doctor to manage your exposure. Vacuuming and damp dusting weekly and keeping pets out of your bedroom can help you manage exposure.
- **Emotions and stress:** Your emotions can trigger your asthma. When you experience strong emotions, anxiety, or stress, your breathing patterns are affected. Crying and laughing both tax your breathing muscles and respiratory system. Any strong emotions, including anger, fear, and even joy, can lead to asthma attacks. Stress or chronic anxiety can also worsen symptoms. Make sure to treat chronic stress and anxiety. Ensure that you have an effective asthma treatment plan for acute attacks.
- **Exercise:** Exercise, particularly in a cold environment, is a common trigger for people with asthma — specifically, exercise-induced asthma (EIA). Even though exercise can trigger asthma attacks for some people, you shouldn't avoid exercise if you have asthma. You should make sure you manage and treat your EIA properly. Make a plan with your doctor to prevent and manage your symptoms so you can enjoy exercising safely.
- **Pests:** Cockroaches, mice, rats, and dust mites can aggravate your asthma symptoms. You may find these pests at home, in your workplace, or at your school. Get rid of pests if possible. Use allergen-proof bedding covers. Vacuum and dust weekly. Store garbage outside. Wash bedding regularly.
- **Pregnancy:** Being pregnant can cause temporary worsening of asthma symptoms because of hormone shifts.

Exercising with Asthma

Almost one in ten people have asthma-related symptoms that are triggered by physical activity. These symptoms may include coughing, wheezing, or shortness of breath. Symptoms may begin during or shortly after physical activity. Many people respond by avoiding exercise, not recognizing that the underlying problem is asthma.

Exercise can benefit people with asthma by

- Improving your lung function, which can build stamina
- Strengthening your muscles, which is good for all parts of your body and promotes blood flow to your lungs and heart
- Helping you lose weight, which reduces the risk of asthma flare-ups
- Improving the functioning of your immune system, which reduces the risk of catching respiratory infections
- Improving your sense of well-being and quality of life
- Helping you reduce stress

Understanding EIA

Exercise-induced asthma (EIA), also called *exercise-induced bronchospasm* or *EIB,* is a condition in which airway muscle spasms constrict air flow, sometimes causing shortness of breath, coughing, wheezing, chest tightness, and fatigue. These symptoms usually appear five to ten minutes after exercise starts or ends.

TIP

If you think you have EIA, make an appointment with a doctor, who will take your medical history and have you perform a breathing test. These breathing tests can be performed after exercise and while resting.

REMEMBER

People with EIA have airways that are very sensitive to sudden temperature changes, especially when they're breathing cold, dry air. Our nasal passages act as a mini sauna for the air we breathe — warming the air and adding moisture. Additionally, the nasal passages help filter out unwanted particles.

Most people breathe through their mouths when exercising, which allows cold, dry air (plus allergens and other irritants) to reach the lower airways. Stuffy noses, often caused by colds, sinusitis, and allergic rhinitis (hay fever), can also result in mouth breathing, so these conditions should be treated as well. High pollen counts and outdoor air pollution may also contribute to asthma symptoms.

Managing EIA

Exercise-induced asthma shouldn't hold you back from exercising or participating in sports. However, it's important to manage your EIA, which may require making some healthy lifestyle changes, such as the following:

- **Making sure to warm up and cool down.** EIA sometimes occurs because of sudden temperature changes in the airways. So, doctors recommend 15 to 20 minutes of steady warm-ups before exercise. A 15- to 20-minute cool-down period after exercise is also recommended.
- **Using a quick-relief albuterol inhaler as prescribed by your doctor.** These inhalers open up and relax muscles in the airways and prevent bronchospasm. Doctors recommend pretreating your airways before any moderate or vigorous physical activity. You may need to use your quick-relief albuterol inhaler 10 to 20 minutes before exercise. This is important even if your symptoms are well controlled. You should also use your albuterol inhaler if symptoms occur during exercise.
- **Staying hydrated.** Keep a water bottle with you when you're exercising. Be sure to drink water *before* you become dehydrated.
- **Checking the environment before exercising.** You may want to avoid strenuous exercise during cold weather, when pollen counts are high, and when the air quality is unhealthy. Schedule your outdoor exercise during times when pollen counts are low. In cold weather, wear a scarf over your nose and mouth to warm the air you breathe; this will also help protect you from air pollution.

TIP

Some activities are better than others for people with EIA. Swimming is often a good choice because it's done in a warm, humid environment. Also, the horizontal position may help move mucus from the bottom of your lungs. If you are sensitive to chlorine, however, you may want to try another activity. Sports with short bursts of activity, such as baseball or golf, may be ideal. You can also try yoga, walking, or leisurely biking or hiking. These forms of exercise may be easier to pace than other types of activity, such as long-distance running.

Seeing Your Doctor Regularly

You should see your doctor at least twice a year for your asthma, even if you are feeling well. These visits will help both of you keep track of your asthma and make changes in your asthma action plan as needed. Ask your doctor or asthma educator for guidelines about when you need to call or come in between these regular visits.

You should follow your asthma action plan (see Chapter 5) and see your doctor as soon as possible in the following situations:

- Your asthma symptoms seem worse than usual or happen more often.
- You are taking your medicine more often to relieve your asthma symptoms.
- A medicine doesn't seem to be working or is making you feel worse.

You should get help right away if you experience any of the following serious situations:

- Your asthma keeps getting worse even after you take your medicine and follow your action plan.
- Your peak flow reading falls into the red zone (see Chapter 5).
- Your lips or fingernails turn blue.
- Your breathing is rapid, and you can speak only in single words.
- You awaken often with nocturnal flare-ups.
- You have to use your rescue inhaler (usually albuterol) regularly to treat flare-ups.

Reminding yourself of doctor visits

Remember, asthma symptoms can change over time. It's important to see your doctor or asthma educator at least twice every year for your routine asthma care, not including when your asthma isn't well controlled.

TIP

Have a way to remind yourself to keep your doctor visit. Put a note on your wall or desk calendar, the refrigerator, your dresser, or some other location where you're sure to see it. Add the appointment to the calendar app on your computer or smartphone and make sure notifications are turned on. If you cannot keep your visit, change the appointment. With time, you and your doctor will find the treatment that works best for you.

Getting vaccinated

AUTHOR SAYS

Get a flu shot each year to try to prevent influenza, which can cause more severe symptoms for people older than 65 or those living with a chronic condition like asthma. Also, ask your doctor about vaccinations for pneumococcal pneumonia and COVID.

You can find a vaccination schedule for adults and children at the Centers for Disease Control and Prevention website at www.cdc.gov/vaccines/schedules.

Using Personalized Asthma Therapies

We now realize that asthma isn't a single disease but a spectrum of diseases with distinct endotypes (subtypes of a health condition). In the past, a patient's phenotype (any observable characteristic or trait of a disease) was the main criterion for making a medical diagnosis and choosing a form of treatment. Now, asthma therapy is gradually moving to a personalized medicine approach, tailored to an individual's asthma endotypes identified through biomarkers (biologic molecules found in blood or tissues of the body).

Ongoing and future biological therapies are significantly changing the way physicians are approaching severe asthma management. These new therapeutic options make it possible to implement phenotype/endotype-specific treatments that lay out a personalized approach, precisely addressing the individual traits of asthma patients. Such tailored strategies are allowing asthma specialists to successfully target the immune-inflammatory responses underlying uncontrolled T2-high asthma, associated with increased asthma severity and elevated rates of asthma exacerbations.

As a result of these advances, several biologic targets have emerged as suitable areas for biological therapies of types of severe asthma that don't respond to standard treatments. Indeed, various treatments now allow us to intervene at different levels of the series of events leading to type 2 (T2) airway inflammation.

IgE (immunoglobulin E, the antibody associated with allergy) was the first molecule against which an anti-asthma monoclonal antibody (omalizumab) was developed. Today, other targets are successfully addressed by biological treatments of severe asthma. In particular, pro-eosinophilic interleukin 5 (IL-5) can be targeted by mepolizumab or reslizumab, whereas benralizumab is a selective blocker of IL-5 receptor. Dupilumab, another biologic, inhibits the physiologic action of multiple interleukins, 4 (IL-4) and 13 (IL-13).

The latest targeted treatment to be approved in the United States focuses on innate cytokines (a type of protein that has an effect on the immune system), such as thymic stromal lymphopoietin (TSLP), which plays a key role in the development of type 2 asthma.

IN THIS CHAPTER

- Understanding what long-term asthma management involves
- Identifying the four levels of asthma severity
- Taking the stepwise approach to treatment
- Evaluating your lungs
- Figuring out self-management
- Enhancing your life and overall health

Chapter 5
Managing Asthma Long Term

Rather than letting your asthma control you, the key to controlling your asthma is to consistently follow a preventive management plan. That means managing your asthma for the long term, rather than dealing with symptoms and episodes only temporarily. Developing and sticking to a long-term asthma management strategy is a priceless investment in your overall health and quality of life, especially if you have persistent asthma. The fundamental point is to address the root cause of your symptoms: the underlying airway inflammation that characterizes asthma. In most cases, after patients realize how much better they feel when they effectively manage their asthma on a long-term basis, they don't go back to the ineffective short-term, crisis-management ways of dealing with their disease.

Realizing What a Long-Term Management Plan Includes

A comprehensive long-term management plan for asthma should include the following elements:

- Undergoing objective testing and monitoring of your lung functions to initially diagnose your condition and to continuously assess the effectiveness of your treatment.
- Avoiding and controlling exposure to asthma triggers and precipitating factors, such as other medical conditions (see Chapter 6).
- Developing a safe and effective medication program that results in minimal or no adverse side effects and includes routinely taking appropriate long-term controller medications and using appropriate short-term quick-relief rescue medications if your symptoms suddenly get worse (see Chapter 14).
- Initiating *pharmacotherapy* (treatment with medications) with a *stepwise* (step-up or step-down) approach (see "Using the Stepwise Approach," later in this chapter).
- Consulting with an asthma specialist, such as an allergist or *pulmonologist* (lung doctor), when advisable.

"OUTGROWING" YOUR ASTHMA: FACT OR FICTION?

Asthma isn't something you usually outgrow. Extensive studies have shown that asthma is an ongoing physical condition that doesn't just disappear forever when you feel better. Your asthma can vary in its symptoms and severity during your lifetime. However, just like the color of your eyes or your individual fingerprint pattern, when you have asthma, it remains another of your distinctive, although unseen, physical characteristics.

The airways of your lungs get bigger as you grow, so if you have asthma, mild airway obstruction may not affect you as much as you get older. Also, as you mature, your sensitivities may not be sufficient to cause noticeable clinical symptoms. However, people who feel that they "outgrew" their asthma as children or teenagers commonly experience symptoms of the disease later in life, particularly in response to certain triggers (see Chapter 6 for more on asthma triggers).

- Tailoring your asthma management plan to your specific circumstances and condition, and continually educating yourself and your family about asthma and your specific condition (see "Understanding Self-Management," later in this chapter).

Focusing on the Four Levels of Asthma Severity

Experts from different fields of medicine have classified the severity of asthma — whether it's allergic or nonallergic — into four levels. These asthma severity levels provide the basis for the stepwise management of the disease.

REMEMBER

Bear in mind, however, that these levels of severity aren't permanent or static. Asthma is a condition that can change throughout your life. The primary goal of the stepwise approach that we describe in this chapter is to get your asthma to the lowest classification possible. Effectively treating your condition is crucial; otherwise, your asthma severity may move up the classification scale to the point where you may suffer from severe, relentless symptoms that adversely affect your quality of life.

As described in the National Institutes of Health (NIH) Guidelines for the Diagnosis and Management of Asthma, the four levels of asthma severity are

- **Intermittent:** Symptoms occur no more than twice a week during the day and no more than twice a month at night. Lung-function testing (see Chapter 3) shows 80 percent or greater of the predicted normal value, compared to reference values based on your age, height, sex, and race, as established by the American Thoracic Society. In addition, your peak expiratory flow rate (PEFR; see Chapter 3) doesn't vary by more than 20 percent during episodes and from morning to evening. Between episodes, you may be *asymptomatic* (not have noticeable symptoms), and your PEFR is normal. If your asthma is at this level, a worsening of symptoms is usually brief, lasting a few hours to a few days, with variations of intensity.
- **Mild persistent:** Symptoms occur more than twice a week during the day, but less than once a day, and more than twice a month at night. Lung-function testing shows 80 percent or greater of the predicted normal value. Your PEFR may vary between 20 and 30 percent. If your asthma is at this level of severity, a worsening of symptoms can begin to affect your activities.

- **Moderate persistent:** Symptoms occur daily and more than once a week at night, requiring daily use of a short-acting bronchodilator. Lung-function testing shows a 60 to 80 percent range of the normal predicted value. Your PEFR can vary more than 30 percent. Symptoms can worsen at least twice a week, with episodes lasting for days and affecting your activities.
- **Severe persistent:** Symptoms occur continuously during the day and frequently at night, limiting physical activity. Lung-function testing is 60 percent or less of the normal predicted value. Your PEFR may vary more than 30 percent, and frequent aggravations of your condition can develop.

When diagnosing your condition, your doctor should identify your asthma's severity level. Check to see which of the severity levels your condition most resembles, based on the definitions we list in this section. Your own symptoms and lung functions may not always fit neatly into one of these particular severity levels. Your doctor should therefore evaluate your individual condition and develop a treatment plan for you based on the specific characteristics of your asthma. Keep in mind, however, that based on symptom criteria and the results of lung-function testing, most asthma patients have some form of persistent asthma — mild, moderate, or severe — requiring long-term control therapy.

If the symptoms you're experiencing seem to indicate that you have persistent asthma, we strongly advise having your lung functions evaluated by *spirometry* if you haven't already done so (see "Assessing Your Lungs," later in this chapter). To have a spirometry evaluation, you may need to ask your doctor for a referral to an asthma specialist, such as an allergist or pulmonologist, because many primary care physicians don't have easy access to a spirometer.

Using the Stepwise Approach

Asthma severity levels are steps in the staircase to controlling asthma, as shown in Figure 5-1. The basic concept of *stepwise management* is to initially prescribe long-term and quick-relief medications based on the severity level that's one step higher than the severity level you're experiencing (see Table 5-1). By using this approach, your doctor can usually help you gain rapid control over your symptoms. After your condition has been under control for a month (in most cases), your physician can reduce the level of your medications by one level (*step down*).

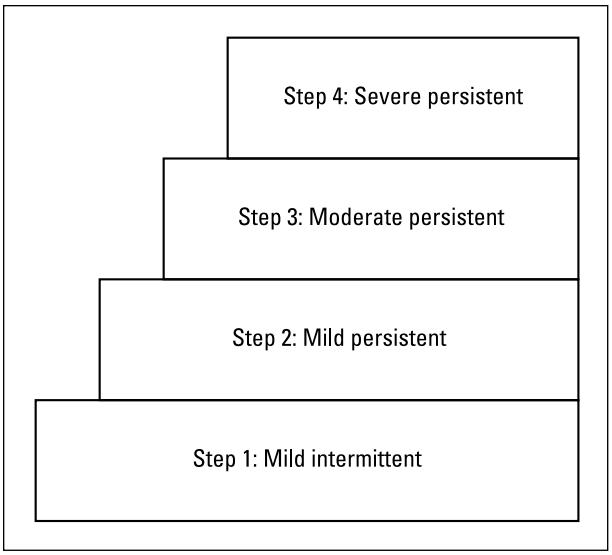


FIGURE 5-1: The steps of asthma severity levels.

REMEMBER

Using the stepwise approach to asthma management means that you *step up* your medication therapy to gain control, and then *step down* your medication therapy to maintain control. Like waltzing, after you and your doctor master the steps, you can move around life's dance floor with the ease and grace of Fred Astaire or Ginger Rogers. Regular monitoring of your PEFR and follow-up visits with your doctor are vital to ensuring that you stay in step, as we explain in the next section.

The information in Table 5-1 is based on the NIH Guidelines for the Diagnosis and Management of Asthma. Please remember that these are guidelines. Your doctor should always evaluate your specific condition and prescribe individualized treatment accordingly.

Abbreviations: ICS = inhaled corticosteroid; LABA = long-acting beta$_2$-agonist; LAMA = long-acting muscarinic antagonist; LTRA = leukotriene receptor antagonist; PRN = as necessary; SABA = inhaled short-acting beta$_2$-agonist.

Stepping down

If you're on long-term maintenance medication at any level, your doctor should review your treatment every one to six months. A gradual stepwise reduction in treatment may be possible after your symptoms are under good control, meaning that you feel well, maintain improved lung function, and experience no asthma symptoms.

TABLE 5-1 **Stepwise Approach for Managing Asthma in Adults and Children Older Than 12**

Step	Level	Preferred	Alternative
Step 1	Intermittent	PRN SABA	None
Step 2	Persistent	Daily low-dose ICS and PRN SABA	Daily LTRA and PRN SABA
Step 3*	Persistent	Daily and PRN combination low-dose ICS-formoterol	Daily medium-dose ICS and PRN SABA or daily low-dose ICS-LABA or daily low-dose ICS + LAMA
Step 4*	Persistent	Daily and PRN combination medium-dose ICS-formoterol	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA and PRN SABA
Steps 2–4			Consider use of subcutaneous immunotherapy (allergy shots) as adjunct treatment to standard pharmacotherapy (medication)
Step 5	Persistent	Daily medium/high-dose ICS-LABA + LAMA and PRN SABA	Daily medium/high-dose ICS-LABA Consider adding asthma biologic (injection or infusion)
Step 6	Persistent	Daily high-dose ICS + LABA + oral systemic corticosteroids + PRN SABA	Consider adding asthma biologic (injection or infusion)

**If your asthma severity is at Step 3 or Step 4, consult an asthma specialist, such as an allergist or pulmonologist (lung doctor), to achieve better control of your condition.*

REMEMBER

The goal of the stepwise approach is to use early and aggressive treatment to gain rapid control over your asthma symptoms, thus allowing your doctor to reduce your medication to the lowest level required to maintain control of your condition.

Stepping up

SEE YOUR DOCTOR

If you find yourself frequently resorting to your quick-relief medications, your symptoms aren't under control, and your doctor should consider increasing your treatment by one step. In assessing whether to step up your therapy, your doctor will probably evaluate the following aspects of your current treatment step:

- Your inhaler technique (see "Evaluating your inhaler technique," later in this chapter).

REMEMBER

- Your level of adherence in taking the medications your doctor prescribes.

  Take your prescriptions as your doctor instructs. It's vital that you follow your doctor's instructions. If you're having trouble with a medication (because of potential side effects) or you don't understand your doctor's instructions, tell them so they can take appropriate measures.

- Your exposure level to asthma triggers, such as allergens and irritants, and precipitating factors, such as viral infections and other medical conditions. Control your exposure to asthma triggers and precipitating factors as much as possible, no matter which step of treatment you're receiving (see Chapter 6 for information on controlling asthma triggers).

Make sure your asthma management plan clearly explains at what point you should contact your physician if your symptoms worsen (see "Realizing What a Long-Term Management Plan Includes" earlier in this chapter).

Treating severe episodes in stepwise management

Your doctor may consider prescribing a rescue course of oral corticosteroids at any step if you suddenly experience a severe asthma episode and your condition abruptly deteriorates. (Chapter 12 provides more information on oral corticosteroids.)

AUTHOR SAYS

You should discuss the risks of using oral corticosteroids with your doctor. Recent studies show more than four courses of this treatment in a lifetime may cause increased side effects like diabetes, heart disease, cataracts, and bone thinning.

WARNING

In some cases, severe episodes can occur even if your asthma is classified as intermittent. Many patients with intermittent asthma may experience severe and potentially life-threatening episodes, often because of upper respiratory viral infections (such as flu or colds), even though they otherwise have long periods of normal or near-normal lung functions and few clinically noticeable asthma symptoms.

Assessing Your Lungs

Objective measurements of your lung functions are essential for monitoring your asthma's severity. Just as you check the gas level in your car on a regular basis (rather than waiting for the flashing red warning light), you and your doctor should regularly check your airways to determine whether you're at the right step

of asthma medication. In addition to recording your asthma symptoms in a daily symptom diary (see "Keeping symptom records," later in this chapter), you should obtain objective measurements of your lung functions with spirometry and peak-flow monitoring.

What your doctor should do: Spirometry

TECHNICAL STUFF

A *spirometer* is a machine that your doctor or asthma specialist, such as an allergist or pulmonologist, uses for measuring airflow from your large and small airways before and 15 minutes after you've inhaled a short-acting bronchodilator. The spirometer helps your asthma specialist diagnose whether you have asthma and also allows your physician to follow your asthma's clinical course of treatment.

For adults and children older than 4 or 5, spirometry currently provides the most accurate way of determining whether airway obstruction exists and whether it's reversible. For information on other types of lung-function tests your doctor may recommend, see Chapter 3, "Making the Most of Your Doctor Visits." To find out more about diagnosing asthma in children younger than 4, see Chapter 15.

What you can do: Peak-flow monitoring

A *peak-flow meter* (see Figure 5-2) allows you to keep an eye on your lung functions at home. The readings from this handy tool may be used in diagnosing asthma and its severity and can also help your doctor prescribe medications and monitor your treatment's effectiveness. Peak-flow monitoring can also provide important early warning signs that an asthma episode is approaching.

REMEMBER

A peak-flow meter is an effort-dependent device. In order to get accurate readings comparing your measurements when your asthma is active with those taken when you're not experiencing symptoms, you must give your maximum effort each time you use your peak-flow meter. The same is true with spirometry performed in your doctor's office. On spirometry readings, your doctor can tell when your efforts aren't consistent; it's much more difficult — and often impossible — to detect consistency or maximum effort with a peak-flow meter. This can result in incorrect treatment decisions.

TIP

Children older than 4 or 5 who have asthma generally can use this small handheld device to measure their own PEFR. If your kid constantly questions your judgment (children often challenge their parents about almost everything), using a peak-flow meter can help them understand when their condition may require them to limit their activities. If your child understands that the PEFR — not just you or the doctor — is advising that they not go to soccer practice on that particular day because of worsening asthma symptoms and a PEFR reduction, you may have more success in helping them control their asthma.

FIGURE 5-2: A patient using a peak-flow meter.

Explaining and using peak-flow meters for children

TIP

Parents may want to explain to their kids that when their peak-flow rate is down, it's like having an injury in their lungs. You can reinforce this analogy by telling your child that although the underlying airway inflammation isn't visible — unlike the swelling that occurs with a sprained ankle, for example — the problem still needs proper treatment, just as a sprain needs to heal before they resume normal activities.

By the same token, when your child's PEFR is between 80 and 100 percent of their personal best, you can breathe easier about encouraging sports and other physical activities that are a vital aspect of improving their overall health and fitness, including their lung functions. Make sure, however, that you and your child know how to manage potential symptoms of exercise-induced asthma (EIA), as explained in Chapter 9.

Using a peak-flow meter at home

TIP

Consider these basic instructions and tips for using most types of peak-flow meters (several different makes and models are currently available). Remember, however, to follow the instructions that come with your specific device. Ask your doctor for advice on the most effective way you can use your peak-flow meter to assess your condition.

Generally, you use a peak-flow meter by following these steps:

1. **Move the sliding indicator at the base of the peak-flow meter to zero.**
2. **Stand up and take a deep breath to fully inflate your lungs.**
3. **Put the mouthpiece of the peak-flow meter into your mouth and close your lips tightly around it.**
4. **Blow as hard and as fast as possible, like you're blowing out the candles on your birthday cake.**
5. **Read the dial where the red indicator stopped. The number opposite the indicator is your peak-flow rate.**
6. **Reset the indicator to zero and repeat the process twice more.**
7. **Record the highest number that you reach.**

Finding your personal best peak-flow number

Your personal best peak-flow number is a measurement that reflects the highest number you can expect to achieve over a two- to three-week period after a course of aggressive treatment has produced good control of your asthma symptoms. Your best number is usually the result of step-up therapy.

TIP

To determine your personal best peak-flow number, take two peak-flow readings a day during an entire week when you're doing well and record the best result. Take one reading prior to taking medication in the morning and another reading between noon and 2:00 p.m. after using an inhaled short-acting bronchodilator. Compare your personal best peak-flow number with the measurement your physician predicts, which is based on national studies for children or adults of particular heights, sexes, and ages. This number can help you determine how your measurements compare with the norm. When your asthma is well controlled, your PEFR should consistently read between 80 and 100 percent of your personal best.

WARNING

If your peak-flow measurements fall below 80 percent, prompt and aggressive intervention with medications and strict avoidance of potential asthma triggers may be necessary to prevent worsening symptoms. Ignoring a declining peak-flow reading can lead to serious symptoms and may result in the need for emergency treatment.

Reading green, yellow, and red peak-flow color zones

The peak-flow zone system involves green, yellow, and red areas that are similar to the lights on a traffic signal. Using your peak-flow meter on a regular basis

enables you and your doctor to treat symptoms before your condition deteriorates further.

TIP

You or your doctor may want to place small pieces of colored tape next to the numbers on your peak-flow meter that correspond with the green, yellow, and red zones your doctor provides as a graph on your written asthma peak-flow diary. (See "Keeping symptom records," later in the chapter, for more about asthma diaries.)

Table 5-2 explains how to read the peak-flow color zones.

TABLE 5-2 The Peak-Flow Color Zone System

Zone	Meaning	Points to Consider
Green zone	Readings in this area are *safe.*	When your reading falls into the green zone, you've achieved 80 to 100 percent of your personal best peak flow. No asthma symptoms are present, and your treatment plan is controlling your asthma. If your readings consistently remain in the green zone, you and your doctor may consider reducing your daily medications.
Yellow zone	Readings in this area indicate *caution.*	When your readings fall into the yellow zone, you're achieving only 50 to 80 percent of your personal best peak flow. An asthma attack may be present, and your symptoms may worsen. You may need to step up your medication temporarily.
Red zone	Readings in this area mean *medical alert.*	Readings in the red zone mean that you've fallen below 50 percent of your personal best peak flow. These readings often signal the start of a moderate to severe asthma attack.

SEE YOUR DOCTOR

If your readings are often in the yellow zone, even after you take the appropriate quick-relief medication your asthma management plan specifies, contact your doctor. If your readings are in the red zone, use your quick-relief bronchodilator and anti-inflammatory medications immediately (based on your individualized asthma management plan) and contact your doctor if your PEFR doesn't immediately return to and remain in the yellow or green zone.

Taking Stock of Your Condition

In addition to obtaining an objective measurement of your lung function with measuring devices, keeping track of a variety of other indicators is an important aspect of controlling your asthma. Your most valuable tracking device is usually a daily symptom diary. In fact, you should develop a rating system (in consultation with your doctor) for your diary that assesses your symptoms on a scale of 0 to 3, ranging from no symptoms to severe symptoms.

Keeping symptom records

REMEMBER

You should monitor and record the following indicators in your daily symptom diary:

- Your signs and symptoms, as well as their severity
- Any coughing you experience
- Any incidence of wheezing
- Nasal congestion
- Disturbances in your sleep, such as coughing or wheezing that awakens you
- Any symptoms that affect your ability to function normally or reduce your normal activities
- Anytime you miss school or work because of symptoms
- How often you use your short-acting beta$_2$-adrenergic bronchodilator (rescue medication)

Tracking serious symptoms

REMEMBER

Your daily symptom diary is also the place to monitor symptoms that are severe enough to make you seek unscheduled office visits, after-hours treatments, emergency room visits, and hospitalizations. Therefore, you also want to note the date and type of treatment you have.

Be sure to record the following types of serious symptoms:

- Breathlessness or panting while you're at rest
- The need to remain in an upright position in order to breathe
- Difficulty speaking
- Agitation or confusion
- An increased breathing rate of more than 30 breaths per minute
- Loud wheezing while inhaling and/or exhaling
- An elevated pulse rate of more than 120 heartbeats per minute

TIP

Furthermore, record any exposures to triggers or precipitating factors that may have caused asthma flare-ups, including

- Irritants, such as chemicals and cigarette or fireplace smoke
- Allergens, such as plant pollen, household dust, molds, and animal dander
- Air pollution
- Exercise (Chapter 9 provides more information on EIA)
- Sudden changes in the weather, particularly cold temperatures and chilly winds
- Reactions to beta-blockers (such as Inderal or Timoptic), aspirin, and related products, including nonsteroidal anti-inflammatory drugs (NSAIDs) and food additives — particularly sulfites (see Chapter 4)
- Other medical conditions, such as upper respiratory viral infections (colds and flu), gastroesophageal reflux disease (GERD), and sinusitis (see Chapter 10)

Monitoring your medication use

REMEMBER

Recording all the side effects you experience when taking your prescribed medication is also important. Various asthma medications include many levels of side effects that a person may experience. However, in most cases, patients who understand their asthma management plan and take their medications according to instructions have few, if any, adverse side effects. The tables in Chapter 13 and 14 provide extensive details on asthma medication products.

It's important to know and remember the names of your medications, especially if you're taking multiple prescriptions for several conditions. The best approach is to keep an updated list of all of your drugs to present to your physician, especially if you're taking multiple medications. Unfortunately, telling the doctor you're on a "white inhaler" or "yellow pill" doesn't provide helpful information for preventing drug interactions with other medications.

Evaluating your inhaler technique

Your healthcare team should show you the correct way to use your inhaler and have you demonstrate your inhaler technique at each office visit. More than 70 percent of patients don't use their inhalers correctly, which keeps the devices from working as well as they should. It's vitally important to use your inhaler correctly with a valved holding chamber to get the medication deep into your lungs where it's needed. Improper inhaler use is often the reason some patients have difficulty controlling their asthma symptoms.

Understanding Self-Management

It takes two (at least) to treat asthma. You and your physician (as well as your other healthcare providers) are partners in controlling your asthma. Other members of your asthma partnership can include nurses, pharmacists, and any healthcare professionals who treat you or assist you in understanding and finding out more about effectively managing your condition.

If you have asthma, your family also — in a sense — has the condition. Asthma isn't contagious; rather, your family also has the condition because you all may need to deal with the various issues associated with your medical condition's treatment. In fact, studies show that family support can be a major positive factor in the success of any asthma treatment plan. Particularly important to your asthma treatment is making sure the people you live with (as well as coworkers, fellow students, or anyone you're around much of the time) help you reduce your exposure to asthma triggers and precipitating factors.

If your child has asthma, you should also be a partner with your child's doctor and other medical professionals in their management of the condition. (Chapter 15 provides details on managing asthma in children.)

Working with your doctor

Participate in developing treatment goals with your doctor. Make sure that you understand how your asthma management plan (see "Realizing What a Long-Term Management Plan Includes" earlier in this chapter) works and that you can openly communicate with your doctor about the effects and results of your treatment.

Making sure your plan is tailored to your specific needs, as well as your family's, is also very important. This can include considering any cultural beliefs and practices that may have an impact on your perception of asthma and medication therapy. Openly discuss any such issues with your physician, so that together, you can develop an approach to asthma management that empowers you to take control of your condition. Ensuring that your plan is tailored to fit you and your family makes you a more motivated patient, which almost always means you'll be healthier.

Evaluating your plan for the long term

Successfully managing your asthma also means constantly assessing your asthma management plan to determine whether it provides you with the means to achieve your asthma management goals.

REMEMBER

Always keep in mind that asthma is a variable, complex, multifaceted condition. Just as many other aspects of your life can change and vary over time, your asthma may also manifest in different ways throughout your life. Remember: Your goal is lifetime management of your condition.

Becoming an expert on your asthma

SEE YOUR DOCTOR

Your education about asthma and its treatment should begin as soon as you're diagnosed. Your doctor should make sure you have a thorough understanding of all aspects of your condition. Ignorance isn't bliss when it comes to managing your asthma effectively. Your education should include factors such as the following:

- Knowing the basic facts about asthma.
- Understanding your asthma severity level, how it affects you, and advisable treatment methods.
- Becoming familiar with all the elements of asthma self-management, including your specific condition, proper use of various inhalers and nebulizers, self-monitoring skills, and effective ways of avoiding triggers and allergy-proofing your home.
- Developing a written individualized daily and emergency self-management plan with your input (see "Realizing What a Long-Term Management Plan Includes" earlier in this chapter).
- Determining the level of support you receive from family and friends in treating your asthma. It's also important for your doctor to help you identify an asthma partner from among your family members, relatives, or friends. This person should find out how asthma affects you and should understand your asthma management plan so they can provide assistance (if necessary) if your condition suddenly worsens. It may help to include them in your doctor visits.
- Asking your doctor or other members of your asthma management team for guidance in setting priorities when implementing your asthma management plan. If you need to make environmental changes in your life, such as allergy-proofing your home (which may include relocating a pet, pulling up the carpets, installing air filtration devices, and many other steps explained in Chapter 7), you may want advice on which steps you need to take promptly and which steps can wait.

Improving Your Quality of Life

Taking asthma medication doesn't mean you can afford to ignore other aspects of your health. Effectively managing your asthma for the long term also requires being healthy overall. The better you take care of yourself, the more success you'll have in treating your asthma and living a full, normal life.

Consider these important commonsense guidelines as you develop an asthma management plan:

- **Eat right.** A healthy, well-balanced diet is especially important for people who have asthma. Include fresh fruits, meats, fish, grains, and vegetables in your diet.
- **Sleep well.** If you experience asthma symptoms during the night that disturb your sleep, tell your doctor. These types of symptoms should be treated, and they may indicate that you're susceptible to precipitating factors such as GERD or asthma triggers such as dust mites in your bedroom (see Chapter 7).

SEE YOUR DOCTOR

- **Stay fit.** When patients are in good physical condition, their asthma is often easier to control. You don't have to sit on life's sidelines just because you have asthma. Your doctor can prescribe medications that you can take preventively to control symptoms of EIA, thus enabling you to enjoy many types of exercise and sports activities in spite of your asthma. (Chapter 9 provides information on appropriate ways to control EIA.)
- **Reduce stress.** By effectively controlling your asthma, you'll feel less anxious about your condition, thus reducing the overall levels of stress in your life and further helping you manage your asthma.

With effective, appropriate care from your doctor and your own motivated participation as a patient, your asthma management plan can enable you to lead a full and active life. However, if properly following your asthma management plan still doesn't allow you to participate fully in the activities and pursuits that matter to you, openly communicate this to your physician so the two of you can work together to adjust your plan and maximize the effectiveness of your treatment.

TIP

If, as sometimes happens, your doctor deals only with your asthma symptoms — instead of initiating the type of long-term approach we discuss in this chapter — you may want to consider requesting a referral to an asthma specialist. You should expect to effectively control your asthma, and your doctor should certainly help you achieve this goal.

2

Knowing What Can Trigger Asthma

IN THIS PART . . .

Understand what can trigger your asthma symptoms.

Recognize how inhalant allergens, such as dust mites, mold, pollens, and animal dander, can adversely affect your condition.

Diagnose food allergies and understand the role they can play in asthma.

Exercise with asthma and deal with the ways emotions can affect your asthma.

Know about the effects other medical conditions may have on your asthma symptoms.

IN THIS CHAPTER

- Identifying what's causing your asthma symptoms
- Avoiding inhalant allergens
- Focusing on exposures in your home
- Recognizing triggers in your workplace
- Steering clear of food and drug triggers
- Dealing with other conditions that can aggravate your asthma

Chapter 6
Knowing Your Asthma Triggers

Water covers two-thirds of Earth's surface. If you have asthma, it may seem at times that the rest of the planet consists of nothing but asthma triggers. Throughout the world and in nearly every aspect of our everyday lives, countless *precipitating factors* — allergens, irritants, or other medical conditions — can trigger asthma symptoms.

Avoiding or limiting your exposure to factors that bring on your asthma symptoms is vital for managing your condition. Steering clear of asthma triggers can help you experience fewer respiratory symptoms and potentially allow you to reduce your need for medication, especially rescue drugs such as short-acting $beta_2$-adrenergic ($beta_2$-agonist) bronchodilators. (See Part 3 for details on asthma medications.)

Controlling your condition often requires dealing with a host of precipitating factors — an especially familiar situation if you have allergic asthma, one of the most common types of asthma. Allergic asthma is usually associated with *allergic rhinitis* (hay fever) and/or allergic conjunctivitis (red, itchy, watery eyes due to allergens; see Chapter 1 for details about allergic asthma).

If the prospect of dealing with a world full of asthma triggers seems scary, don't despair. Throughout this chapter, we provide information and tips, based on extensive experience and the latest research findings, that can help you — in consultation with your doctor — take practical and effective measures to avoid or reduce exposure to your asthma triggers.

Recognizing What Sets Off Your Asthma

All asthmatics have what's considered increased bronchial activity. This means their *bronchi* (airways in the lungs) are "hyperactive" in that they respond to exposure to inhaled substances in an exaggerated manner. These bronchi often react at lower doses of the substance (irritant or allergen), and their reactions are stronger than the responses of normal bronchi. This bronchial hyperactivity is central to the disease and can be used to distinguish people with asthma from those who don't have asthma. In addition, there's a strong correlation between the degree of bronchial hyperactivity and the overall severity of a given case. Anything that increases this hyperactivity makes asthma worse, and treatments that diminish this hyperactivity can make asthma better.

When we talk about triggers, it's essential to distinguish triggers that can increase bronchial hyperactivity from those that don't. Those that worsen hyperactivity do so by producing an inflammatory response in the bronchial tubes. Because of this inflammatory reaction, worsening of the disease for long periods of time, even after the trigger has been removed, can occur. Bronchial hyperactivity also predisposes a person to lung scarring and remodeling. That's why it's important to distinguish triggers that worsen hyperactivity from those that don't. For example, exercise typically doesn't worsen airway hyperactivity. This is why doctors frequently use only albuterol without an anti-inflammatory medication to treat exercise-induced asthma. On the other hand, allergen exposure can cause a prolonged increase in bronchial hyperactivity. A single exposure to an allergen, a cat, for example, can even increase hyperactivity for several days and even weeks.

Evaluating triggers

REMEMBER

One of the most important steps you can take to effectively manage your asthma is to identify what triggers the symptoms of your condition. These triggers (see Figure 6-1) include

- Inhalant allergens, such as animal dander, dust mite and cockroach allergens, some mold spores, and certain airborne grass, weed, and tree pollens (see Chapter 7).
- Irritants and allergens found primarily in the workplace that induce occupational asthma (see "Working Out Workplace Exposures," later in this chapter) or aggravate an already existing form of the disease.
- Other irritants that you inhale, such as tobacco smoke, household cleaning products, and indoor and outdoor air pollution.
- Nonallergic triggers, including exercise and physical stimuli such as variations in air temperature and humidity levels.
- Other medical conditions, including *rhinitis* (stuffy nose), *sinusitis* (sinus infection), gastroesophageal reflux disease (GERD), and viral infections; sensitivities to aspirin, beta-blockers, and other drugs; and sensitivities to food additives — particularly sulfites.
- Emotional responses, such as crying, laughing, or even yelling. Although emotions aren't the direct triggers of asthma symptoms — and clearly asthma isn't an "emotional problem" — responses associated with emotions (happy or sad, angry or frightened) can induce coughing or wheezing in people with preexisting hyperreactive airways (see Chapter 9), as well as in individuals who don't have asthma but may suffer from other respiratory disorders. For example, your friend with a bad cold may say, "Please don't make me laugh; if I do, I'll start coughing."

Tracking and testing for allergic triggers

To determine what triggers your asthma symptoms and your sensitivity levels to those triggers, your doctor should take a thorough medical history. You can assist in your doctor's assessment by keeping an asthma diary (see Chapter 3) that provides details of your symptoms and your exposures to potential triggers. Be prepared to give your doctor specific information about the respiratory symptoms you experience.

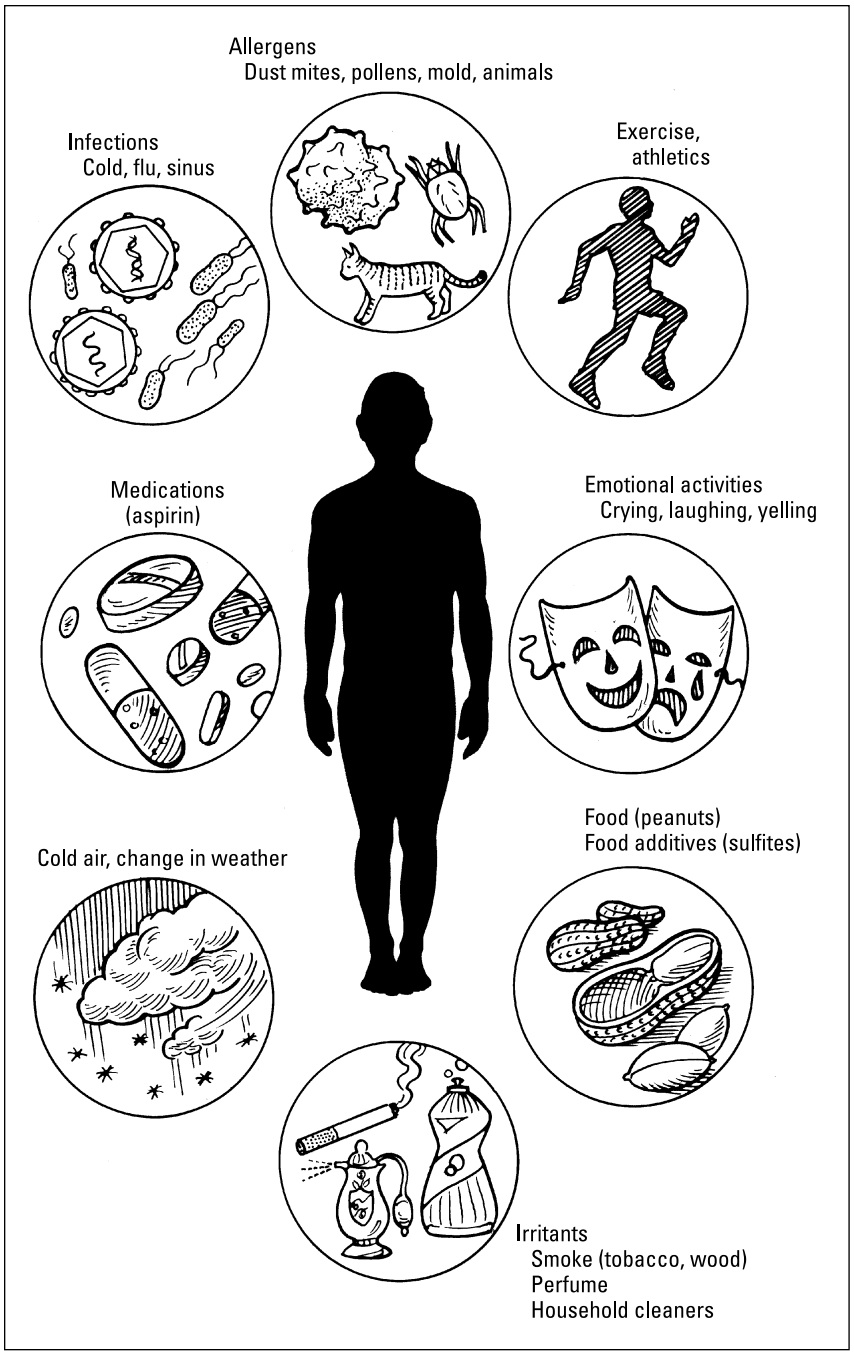


FIGURE 6-1: Common asthma triggers.

Many asthma patients experience *perennial* (year-round) symptoms that worsen during particular seasons. Because a wide range of triggers can contribute to perennial asthma episodes, provide your doctor with a record of the seasonal patterns of your symptoms.

For example, if your asthma consistently worsens during late summer and fall in the eastern parts of the United States, your physician may suspect ragweed or mold as a prime cause of the allergic reactions that aggravate your condition. However, doctors usually advise allergy testing (see Chapter 11 for a complete explanation of allergy testing) to investigate other possible causes and to confirm the diagnosis and determine appropriate treatment.

TIP

If you have persistent asthma (see Chapter 5) with year-round symptoms that occur primarily indoors, allergy testing can help your doctor identify several of the triggers, such as dust mites, that may be affecting you.

Nocturnal or *nighttime asthma* — which often shows up as a cough, wheezing, or shortness of breath that disturbs your sleep and may require you to use your short-acting adrenergic bronchodilator (see Chapter 14) — can often be severe. Almost all asthmatics have worsening symptoms at night; in other words, nocturnal symptoms are *intrinsic* to the disease. Although we aren't sure what the underlying cause of worsening nighttime symptoms is, we think an important cause is the variation in body functions known as the circadian rhythm. The *circadian rhythm* (also known as *diurnal variation*) controls your body's internal clock and may affect your asthma by making you more susceptible to symptoms in the early morning hours (around 3:00 to 5:00 a.m.). Also, during the late evening and early morning hours, a number of changes in hormone levels can affect asthma. These include a decrease in plasma levels of hormones from the *adrenal glands* (glands above your kidneys), perhaps the most important of which is *cortisol*. At the same time, a decrease in plasma epinephrine and an increase in plasma histamine also occur.

Allergens in your bedroom, postnasal drip from allergic rhinitis (see Chapter 7), or chronic sinus problems such as sinusitis (see Chapter 10) often trigger nocturnal asthma. Other factors that can cause nocturnal asthma include

- GERD
- Airway cooling and drying
- Lying down in bed (instead of sitting)
- A biphasic response, which includes the immediate reaction and a delayed reaction known as a *late-phase reaction* to allergens you've been exposed to during the day

Controlling Inhalant Allergens

Inhalant allergen triggers, also known as *aeroallergens*, are probably the most familiar asthma precipitants because they're also associated with allergic rhinitis and similar conditions (see Chapter 7). If you have allergic asthma, reducing your exposure to inhalant allergens is the first and most important step to take — in consultation with your doctor — to manage your condition.

The following list details the most common inhalant allergens to look out for:

- **Animal allergens:** Pet dander, which may contain traces of saliva, is a potent trigger of symptoms for many people with asthma. Although dogs and cats are the most common sources of these allergens, all warm-blooded animals, such as horses, rabbits, small rodents, and birds, produce dander — regardless of their hair length (the source of the allergen is actually the skin rather than the hair). Urine from these animals is another source of allergens. Animal dander also serves as a food supply (along with dead human skin cells) for dust mites, as we explain in Chapter 7.
- **Dust mites:** Dust mites live almost everywhere humans settle, and they thrive in mattresses, carpets, upholstered furniture, bed covers, linens, clothes, and plush toys (like stuffed animals). Although completely getting rid of these dusty denizens is virtually impossible, you can take practical and effective steps to minimize your exposure to the allergens dust mites produce.

  See Chapter 7 for more dirt on dust mites, and Chapter 4 for details on measures to control these creatures.

REMEMBER

- **Cockroaches:** As if you need another reason to avoid cockroaches, exposure to allergens from cockroach droppings (yuck!) in house dust can trigger and aggravate your asthma symptoms.

  Many asthmatic patients of inner-city clinics, which are often in areas with large numbers of cockroaches, have tested positive for cockroach allergens (through allergy skin testing) and have improved after immunotherapy (allergy shots) with cockroach allergen extract. (See Chapter 11 for more information on allergy skin testing and immunotherapy.)

TIP

  To control cockroach allergens in your home, take these key steps:

  - Exterminate cockroach infestations. During the fumigation process, stay out of your home, and allow it to air out for several hours before reentering. (This advice applies to anyone, regardless of whether you have asthma.)
  - Clean your entire home thoroughly after extermination.

- Set roach traps.
- Seal any cracks or other ways into your home to prevent reinfestation.
- Keep your kitchen clean by washing dishes and cookware promptly and by emptying garbage and recycling containers (including old newspapers) often. Avoid leaving food out.

» **Mold:** The airborne spores that molds (fungal growth) release in typically damp areas of many homes, particularly basements, bathrooms, air conditioners, garbage containers, and carpeting, can trigger allergy and asthma symptoms when you inhale them. Mold can also thrive in leaf piles, compost heaps, cut grass, fertilizer, hay, and barns. Airborne mold spores are more numerous than pollen grains and don't have a limited season. Depending on where you live, you may be exposed to airborne mold spores throughout the year, based on humidity levels.

See Chapter 7 for more moldy matters, including tips on translating mold counts and what you can do to reduce mold exposures.

» **Pollen:** From spring through fall, many varieties of trees, grasses, and weeds release pollen that can trigger symptoms of allergic rhinitis or allergic conjunctivitis. These reactions can also affect your asthma, aggravating the underlying airway inflammation.

Many people primarily associate pollen with outdoor exposure. However, because most pollens are wind-borne, they can often make their way indoors and trigger your allergy and asthma symptoms in your home.

See Chapter 7 for more pollen particulars, including tips on pollen counts and steps you can take to avoid excessive exposure to pollen, especially during periods of high pollination.

Clearing the Air at Home

Indoor environments at home, work, and school and in cars as well as other enclosed means of transportation can often provide far more significant sources of asthma triggers than the outdoors because most enclosures concentrate irritants and allergens. Therefore, you should seriously consider the ways indoor air pollution can induce or aggravate your allergies and asthma, while working to rid your home of anything that triggers your symptoms.

Household irritants

REMEMBER

The most significant irritant triggers of asthma in many households are

- Tobacco smoke (see the next section)
- Fumes and scents from household cleaners, strongly scented soaps, perfumes, glues, and aerosols
- Smoke from wood-burning appliances or fireplaces
- Fumes from unvented gas, oil, or kerosene stoves

Other sources of indoor air pollution include pollens and mold spores that get inside, especially on windy days when windows and doors are open. These allergenic materials can also invade your home via your clothing and hair. In fact, if you have allergic asthma, you may wake up congested and wheezing in the morning because allergenic materials find their way into your house so easily. (The pollen or mold spores in your hair probably wound up on your pillow, so you spent the night breathing those allergens into your lungs.) Therefore, we often recommend that patients shower and wash their hair before bed when pollen and mold counts are high.

No smoking, please

As far as truly irritating irritants go, tobacco smoke is the number one indoor air pollutant. Secondhand smoke has been associated with an increase in the following adverse health effects: persistent wheezing associated with asthma, hospital admissions for respiratory infections, earlier onset of respiratory allergies, decreased lung function, and even increased incidence of *otitis media with effusion*, or inflammation of the middle ear (see Chapter 10).

WARNING

Tobacco smoke frequently provokes asthma symptoms in children. In fact, numerous studies show that parental smoking, especially by the mother, is a major risk factor in the development of asthma in infants who are exposed to secondhand smoke during the first few months of life. Therefore, don't smoke and make sure the people around you don't smoke, especially if you have children.

Filters and air-cleaning devices

REMEMBER

The quality of the air you breathe indoors largely depends on the condition of your heating, ventilation, and air-conditioning (HVAC) system, as well as the air and particles that circulate throughout it.

TIP

If you're exposed to airborne allergens and irritants such as animal dander, mold spores, pollen, and tobacco smoke, consider using air filters on your HVAC ducts to reduce the level of allergy and asthma triggers circulating through your home. Keep in mind, however, that these filters don't remove substances that have already settled in bedding, carpeting, and furniture — especially dust mite allergens. Dust mite allergens are generally larger than other airborne allergens and irritants, and they usually fall from the air within a few minutes after being stirred up in dust or air currents.

The two types of air filtration systems often recommended by doctors for reducing indoor levels of airborne allergens and irritants are

- **High-efficiency particulate arrester (HEPA):** These filters are designed to absorb and contain 99.97 percent of all particles larger than 0.3 microns (1/300 the width of a human hair). If the unit truly operates at that level, only 3 out of 10,000 particles get into your indoor environment. Vacuum cleaners and air purifiers with HEPA and ULPA filters (see the next bullet for more information) can play a vital part in allergy-proofing your home.
- **Ultra-low particulate air (ULPA):** This system filters more thoroughly than the HEPA process and is designed to absorb and contain 99.99 percent of all particles larger than 0.12 microns.

TIP

If your home doesn't have a central HVAC system, you can purchase stand-alone HEPA and ULPA air cleaners for use in individual rooms.

Vacuum cleaning is also vital for reducing your exposure to allergens and irritants at home. However, many standard vacuum cleaners absorb only larger particles, and they allow many allergens to escape in the exhaust. This is why you may often experience asthma symptoms after doing housework: The vacuuming may have made matters worse for you by simply stirring up triggering substances that you then inhaled.

TIP

To avoid stirring up asthma triggers when you vacuum, ask your doctor whether they think investing in a vacuum cleaner that uses a HEPA or ULPA filtration process may work for you.

Working Out Workplace Exposures

Exposures to many types of chemicals and dust in workplace environments can induce different forms of occupational asthma. In many cases, people who have asthma but haven't yet developed obvious symptoms of the disease may

experience asthma episodes for the first time because of exposure to occupational triggers. Allergic and nonallergic triggers can play a part in occupational asthma, which may account for as many as 15 percent of all new asthma cases each year in the United States.

Targeting workplace triggers

Doctors and other healthcare professionals typically associate occupational asthma with exposure to the following workplace triggers:

- **Industrial irritants:** These irritants can include chemicals, fumes, gases, aerosols, paints, smoke, and other substances you primarily find in the workplace. Tobacco smoke in the workplace can cause many asthma symptoms. Other irritants in the workplace may include food odors, and even heavily scented perfumes and colognes that some coworkers might use.
- **Occupational allergens:** Many jobs involve exposure to or contact with substances made of plant materials, food products, and other items that contain allergenic extracts that can trigger allergic reactions, thus inducing occupational asthma in sensitized people. For example, *Baker's asthma* can occur in workers who have constant respiratory exposure to the allergens contained in flour. (Eating the resulting baked food usually doesn't produce symptoms in these workers, however.) Latex is another common occupational allergen, as we explain in the sidebar "Latex and your lungs."
- **Physical stimuli:** These stimuli include environmental conditions in your workplace, especially variations in temperature and humidity, such as heat and cold extremes or air that's especially dry or humid.

Diagnosing and treating workplace triggers

Your physician should distinguish between asthma that results from exposure to certain substances in the workplace, school, or other locations (besides your home) you regularly spend time in and a preexisting condition that's aggravated by occupational allergens and irritants. This determination is vital to developing appropriate and effective methods of avoiding or reducing your exposure to occupational substances that may affect your asthma.

Diagnosing your occupational asthma is important for your long-term health and the successful management of your disease. The sooner you can effectively avoid or reduce your exposure to triggers at work, the better you can control your asthma.

LATEX AND YOUR LUNGS

Although the incidence of latex allergy has been markedly reduced with the introduction of nonpowdered and nitrile gloves, latex is still occasionally used in medical facilities. It can be found in some medical gloves and medical equipment, such as latex ports in intravenous tubing for administration of fluids and medications.

Exposures can result in allergens from the rubber compounds sensitizing medical personnel. Latex is therefore considered a cause of occupational allergy and asthma in the healthcare industry. In addition, patients being treated in medical facilities can be exposed and sensitized to latex.

These exposures can lead to serious symptoms of allergic rhinitis, asthma, *urticaria* (hives), *angioedema* (deep swellings), and, in extreme cases, *anaphylaxis* (a potentially life-threatening reaction that affects many organs simultaneously).

The U.S. Food and Drug Administration requires labeling of all medical devices and packaging containing natural rubber latex. Parents should be aware that latex-sensitive children can be at risk for severe respiratory reactions from rubber balloons.

If you're at risk for allergic reactions to latex exposure, make sure that any healthcare professional who treats you knows this fact so you can, ideally, receive medical/dental care in a latex-free environment — a setting in which no latex gloves are used, and no latex accessories (such as catheters, adhesives, tourniquets, and anesthesia equipment) come into contact with you. Similarly, if your occupation involves contact with latex, find out what you can do to avoid or minimize your exposure to this allergen. In healthcare settings, powder-free latex gloves and non-latex gloves and other latex-free medical equipment are increasingly available. Using these alternative products can substantially reduce the risk that you may suffer an allergic reaction to latex.

Additionally, wear a medical alert bracelet or pendant to alert medical personnel not to use latex products if you're unconscious or unable to communicate during a medical emergency. If you've experienced a serious allergic reaction to latex, also ask your doctor whether an emergency epinephrine kit, such as an EpiPen or an Auvi-Q, with an injectable dose of epinephrine, is advisable for you.

In diagnosing a case of occupational asthma, your doctor may first need to assess the following factors:

- **The pattern of your symptoms:** Symptoms that improve when you're away from work strongly suggest that your problem is indeed work-related.

- **Your coworkers' symptoms:** Do your coworkers suffer from similar symptoms?
- **The degree of exposure:** Did your first noticeable asthma episode at work occur after a particularly significant exposure, such as a spill of chemicals or other industrial substances?

SEE YOUR DOCTOR

Depending on your condition's severity, your doctor may prescribe medications that control your asthma symptoms at work. In most cases, however, for this treatment to be effective, your doctor will probably advise you to find ways of avoiding or at least reducing your exposure to workplace triggers.

Avoiding Drug and Food Triggers

Some people with asthma also suffer from sensitivities — sometimes potentially life-threatening — to certain foods and medications. In the following sections, we explain the most significant sensitivities that can adversely affect your asthma and what you can do to avoid them.

Aspirin sensitivities

Approximately 10 percent of asthma patients experience some level of sensitivity to aspirin, aspirin-containing compounds (such as Alka-Seltzer, Anacin, and Excedrin), and nonsteroidal anti-inflammatory drugs (NSAIDs). If your medical history includes nasal polyps and sinusitis in addition to asthma and aspirin sensitivity, use acetaminophen-based products such as Tylenol instead of aspirin or NSAIDs to relieve common aches and pains.

TECHNICAL STUFF

A more serious form of aspirin sensitivity is the *aspirin triad.* This condition affects aspirin-intolerant patients who have asthma and chronic nasal polyps as well as a history of sinusitis. If you suffer from the aspirin triad, adverse reactions to aspirin, aspirin-containing compounds, NSAIDs, and possibly newer prescription NSAIDs known as COX-2 inhibitors, including celecoxib (Celebrex), can result in severe or potentially life-threatening asthma attacks.

AUTHOR SAYS

We strongly advise anyone with this level of sensitivity to wear a MedicAlert bracelet or pendant. This device alerts medical personnel not to administer any medication to which you are sensitive if you're unconscious or unable to communicate during a medical emergency.

Beta-blockers, including Inderal, Lopressor, and Corgard, to treat conditions such as migraine headaches, high blood pressure, *angina* (chest pain), or *hyperthyroidism* (overactive thyroid), and beta-blocker eye drops for eye conditions such as glaucoma. If you have one of these disorders and you also have asthma, know that taking beta-blockers can worsen your asthma symptoms by blocking the $beta_2$-adrenergic receptor sites in your airways that cause *bronchodilation* (opening of the airways), thus making your asthma less responsive to $beta_2$-adrenergic ($beta_2$-agonist) bronchodilators.

WARNING

Occasionally, taking beta-blockers can trigger asthma episodes in susceptible individuals who haven't previously experienced any respiratory symptoms.

SEE YOUR DOCTOR

Because beta-blockers may trigger asthma symptoms, make sure that any doctor you consult for any of the conditions we mention in this section knows you have asthma and has your complete medical history. If beta-blockers aren't advisable, your doctor may prescribe alternative forms of medication therapy, such as other families of *antihypertensives* (blood pressure medicine) or other types of antimigraine drugs.

Sensitivities to sulfites and other additives

Sulfites are often used as antioxidants to preserve beverages such as beer and wine, and foods like dried fruit, shrimp, and potatoes. These antioxidants are also often used as a preservative in salad bars and in guacamole. Exposure to these food additives can trigger severe asthma symptoms — including potentially life-threatening *bronchospasm* (constriction of the airways) — in as many as 10 percent of people who have severe persistent asthma when they inhale sulfite fumes from treated foods. Severe asthmatics who require long-term treatment with oral corticosteroids (see Chapter 13) are more likely to be sulfite-sensitive and may be especially at risk for severe adverse reactions to these additives.

WARNING

If you're sensitive to sulfites, avoid consuming beer, wine, and processed foods. Also, carry rescue medication, such as an EpiPen, Twinject, or short-acting inhaled bronchodilator, in case you unintentionally ingest food or liquids that contain sulfites. Eating more fresh foods instead of processed foods, particularly fruits and vegetables, is a good idea anyway, regardless of whether you have asthma.

WARNING

Tartrazine (FD&C yellow No. 5 dye), used in many medications, foods, and vitamin products, has been reported to possibly cause adverse reactions in asthmatics. If you're sensitive to this food additive, check the labels on liquid medications, such as cough syrups and other cold and flu remedies, to see whether they contain tartrazine or sulfites. When in doubt, ask your pharmacist.

Food allergies

Some people with asthma develop hypersensitivities to certain foods. Although some foods have the potential to cause anaphylaxis, they don't appear to significantly increase the underlying airway inflammation that's characteristic of asthma in most patients.

If your infant or young child has food allergies, they may tend to develop other allergy-related problems. In this case, your doctor should evaluate your child for possible signs of asthma and other atopic (allergic) diseases, such as allergic rhinitis and *atopic dermatitis* (eczema).

If you've experienced an episode of anaphylaxis, ask your doctor whether an emergency epinephrine kit, such as an EpiPen or Auvi-Q, is advisable for you. Wear a medical alert bracelet or necklace in case you're unable to speak during a reaction.

If you're hungering for details on food allergies, turn to Chapter 8.

Managing Other Medical Conditions and Asthma

In addition to the triggers we discuss in this chapter, certain activities, illnesses, and syndromes can induce your asthma symptoms or make them worse. Managing these precipitating factors is as vital to effectively controlling your asthma as avoiding allergens and irritants.

Rhinitis and sinusitis

Poorly managing allergic and nonallergic forms of rhinitis can lead to *sinusitis.* This infection of the sinuses can aggravate your asthma symptoms, especially if it isn't responsive to repeated courses of antibiotic treatment. If so, sinus surgery may be necessary to treat sinusitis and reestablish control over asthma symptoms. Studies show that asthma patients who effectively manage their rhinitis and sinusitis can significantly improve their asthma symptoms.

Because your respiratory tract is essentially a continuum — think of it as the united airway — treating your nose and sinuses can help treat the underlying airway inflammation that characterizes asthma. In fact, when dealing with serious respiratory diseases such as asthma, doctors increasingly consider it vital to treat the whole patient — not just the patient's lungs. For more information on dealing with sinusitis and other rhinitis complications, turn to Chapter 10.

Gastroesophageal reflux disease

The digestive disorder *gastroesophageal reflux disease* (GERD) occurs when the valve that separates the esophagus from the stomach doesn't function properly. As a result, stomach acid and undigested food can wash up into the esophagus (and occasionally, through inhalation, into the respiratory tract) from the stomach in individuals who suffer from GERD. You can see a cross-section of the organs involved in GERD in Figure 6-2.

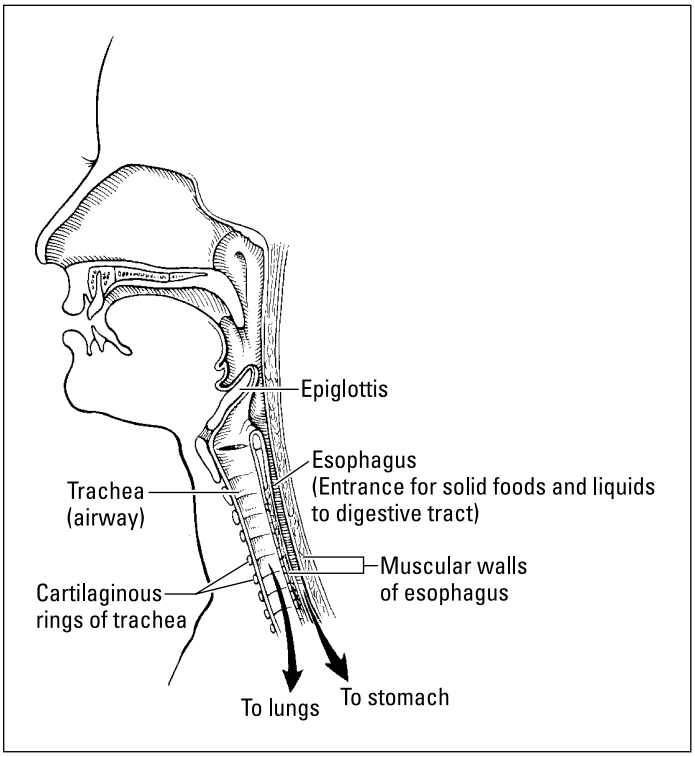


FIGURE 6-2: GERD occurs when stomach contents spill over into the esophagus.

Patients who suffer from GERD often burp during and after meals, complain of an acid taste in their mouth, and feel a burning sensation in their throat or chest, symptoms they typically describe as heartburn or indigestion.

GERD is a trigger of asthma symptoms in many asthmatics and is, in particular, a major trigger of adult-onset asthma (see Chapter 1) in patients whose asthma symptoms (coughing, wheezing, shortness of breath) aren't usually associated with allergic triggers. If you live with asthma, the flow of acidic digestive contents into your respiratory tract can make your underlying airway inflammation worse. GERD, with or without inhalation of stomach contents, has also been associated

with increased bronchospasm and chronic cough due to irritation of the esophagus. Conversely, when asthma is active, it can aggravate GERD, and some of the drugs used to treat asthma, such as long-acting beta$_2$-adrenergic bronchodilators (see Chapter 13 for details on long-term asthma medications), can also worsen GERD symptoms.

SEE YOUR DOCTOR

If you have frequent heartburn and poorly controlled asthma, particularly with episodes that occur at night and disturb your sleep, your doctor should investigate the possibility that GERD contributes to your asthma symptoms.

TIP

To help ease the effects of GERD, your doctor may advise the following:

- Avoid eating or drinking within 3 hours of going to bed.
- Avoid heavy meals and minimize dietary fat. Also, try to eat several small meals over the course of the day instead of fewer large meals.
- Eliminate or cut down on the consumption of chocolate, peppermint, alcoholic beverages, coffee, tea, and carbonated beverages.
- Avoid or reduce smoking and the use of any tobacco products.
- Try elevating the head of your bed, by using 6- to 8-inch blocks, so that your stomach contents are less likely to rise to the point that you can inhale them while sleeping. Adding pillows under your head can also be of some benefit.
- To control the digestive problems that result from your GERD symptoms, use appropriate over-the-counter (OTC) products, including Tagamet, Axid, and Pepcid AC. Your physician may also recommend medications such as Nexium, Protonix, Aciphex, and Prevacid, which decrease *gastric* (stomach) acid secretion.

Common viral infections

Viral respiratory infections, such as the common cold, flu, or COVID-19 and other coronavirus disease (see "COVID and asthma," later in this chapter), can aggravate airway inflammation and trigger asthma symptoms. Asthmatic children younger than 10 are particularly prone to asthma symptoms precipitated by *rhinovirus infections* (upper respiratory infections, usually referred to as the common cold).

Rhinovirus infections cause bronchial hyperreactivity and promote allergic inflammation, leading to increased asthma symptoms. For infants and toddlers, viral infections of all types are the most common cause of severe asthma episodes because young children have smaller airways that are often more susceptible to bronchial obstruction. These infections are also the most common cause of episodes in adults, especially those with nonallergic (intrinsic) asthma.

WHAT TO DO ABOUT THE FLU

Antiviral medications can help you avoid coming down with influenza even when you've had a flu shot. Flu vaccines consist of the World Health Organization's (WHO) best guess of the viruses from the preceding year that may cause the flu during next year's influenza season. However, the WHO's predictions aren't always accurate. As a result, a flu shot may not fully protect you against the viral strains that cause the current year's flu epidemic, thus making antiviral medications extremely beneficial.

SEE YOUR DOCTOR

Inform your doctor whenever you experience flu or cold symptoms. As comforting as you may find chicken soup when you're sniffly and sneezy, you may require early and aggressive medication therapy to keep the virus from adversely affecting your asthma.

Consider the following measures when you're dealing with viral infections:

- If you have persistent asthma, ask your doctor about receiving an annual flu vaccine to reduce the risk of suffering from an influenza respiratory infection that may aggravate your asthma symptoms.

AUTHOR SAYS

- Prescription antiviral medications, such as zanamivir by inhalation (Relenza) and oseltamivir phosphate by oral tablet (Tamiflu), can stop the flu in its tracks and get you back on your feet sooner if you take them within the first two days of developing flu symptoms. Common flu symptoms include high fever, muscle aches, fatigue, and increased respiratory symptoms. Using these antiviral products can reduce the respiratory complications that accompany influenza infections, making these medications especially beneficial if you have asthma. However, antiviral medications are only for influenza and aren't effective against the common cold.

SEE YOUR DOCTOR

- If your young child or infant experiences repeated viral infections that cause coughing and wheezing episodes, and your family medical history includes *atopy* (the genetic susceptibility for the immune system to produce antibodies to common allergens, which leads to allergy symptoms), make sure your doctor evaluates your child for the possibility of asthma. (See Chapter 15 for more information about asthma and children.)

COVID and asthma

By now, you're probably familiar with the symptoms of coronavirus disease: high temperature, chills, a new continuous cough, changes to your normal sense of smell or taste, shortness of breath, fatigue, headache, sore throat, blocked nose,

loss of appetite, and gastrointestinal upset. Some of these symptoms, such as breathlessness and coughing, are similar to asthma symptoms, but high temperature, tiredness, and change in taste or smell are not characteristic of an asthma attack and are more likely due to a coronavirus infection.

SEE YOUR DOCTOR

If you test positive for COVID with these symptoms, you need to stay home and avoid contact with other people. Most people can manage their symptoms at home if they get lots of fluids and plenty of rest, and maintain close fever control. Although studies have shown that most people with asthma aren't at higher risk from coronavirus, some asthmatics may be more at risk from coronavirus if they're affected by the following factors:

- They aren't taking their medications as prescribed.
- Their asthma is uncontrolled.
- They smoke.
- They're overweight.
- They have other health conditions, such as heart disease or diabetes.

TIP

The message is clear: Keep taking your asthma medicines as you normally would and follow your asthma action plan to keep yourself on track if COVID worsens your asthma symptoms. Contact your physician for guidance on any additional needed treatments, such as antivirals like nirmatrelvir and ritonavir (Paxlovid).

SEE YOUR DOCTOR

It can take a while to recover from coronavirus infections, even relatively mild ones. Be sure to continue treating your asthma as usual. Most people will get better within 4 weeks, but others may need 12 weeks or longer to recover. Symptoms that persist beyond 12 weeks may be due to long COVID, according to some experts. Some symptoms of long COVID, such as shortness of breath, persistent cough, chest pain, and fatigue, can resemble asthma symptoms. If you aren't getting better, consult your doctor and consider asking for a referral to a specialist who can further evaluate and treat your condition.

IN THIS CHAPTER

- Understanding what you're breathing
- Reading pollen counts: News you can use
- Minding mites and other dusty denizens
- Knowing how your home affects your health
- Identifying, controlling, and avoiding allergens and irritants in your environment

Chapter 7
The Role of Inhalant Allergies

Something's in the air — and it may be affecting your asthma. Under normal circumstances, breathing is a reflex you don't even think about — as long as nothing interferes with the process. However, unless you live in a bubble, every time you breathe in, you inhale more than just oxygen.

In fact, the air that most people breathe is full of many types of airborne particles that are too small for the naked eye to see. In addition to pollutants and other airborne materials, these particles include allergenic substances, known as *aeroallergens,* that can trigger allergic reactions and significantly affect the well-being of people with asthma or allergies. The inhaled aeroallergens that trigger allergic reactions are known as *inhalant allergens.*

The following inhalant allergens are the most common triggers of *allergic rhinitis*, also known as hay fever (see Chapter 10), and asthma (see Chapter 6 for further information on how these allergens affect people with asthma):

- Pollens produced by wind-pollinated plants, such as ragweed
- Wind-borne mold spores
- Household dust, which can contain various types of allergenic substances, such as dust mite allergen, dander and other allergenic materials from household pets and pests, allergenic fibers, and indoor mold spores

In this chapter, we give you the lowdown on these common inhalant allergens and explain the dangers of each in detail. We also discuss ways you can avoid, or at least limit, your exposure to these allergens.

Protecting against Pollens

Pollens can trigger allergic rhinitis and asthma symptoms. Plants that depend on wind rather than insects for pollination — grasses, trees, and weeds — produce pollens. These plants release their wind-borne pollens in huge quantities to reproduce. For example, ragweed plants may release up to 1 million pollen granules in a day, and the massive amounts of pollen granules that some trees release can resemble clouds.

Pollens are such a universal feature of life on our planet that pollen samples from excavation sites enable archaeologists and botanists to reconstruct what the natural environments of ancient times probably were like.

Pollen particulars

Seed-bearing plants reproduce by *pollination*, which involves the transfer of pollen granules — the plants' sperm cells — from male parts of a plant to receptive female reproductive sites. When pollen granules reach the plant's female sites, they produce pollen tubes that carry the sperm cells close to the female reproductive cells. (See — technical stuff can sometimes be exciting!)

A variety of means, including insects, animals, and the wind, provide transportation for pollen granules. Wind-borne pollens that trigger allergic rhinitis symptoms come from three classifications of plants:

- **Grasses:** The grasses that cause most grass-induced allergic rhinitis are widespread throughout North America and were imported from Europe to

feed animals and create lawns. By contrast, the many native grasses of North America produce little pollen. We provide more details on these grasses in the "Allergens in the grass" section, later in this chapter.

- **Weeds:** The most important weeds that trigger symptoms of allergic rhinitis are those of the genus *Ambrosia,* known as *ragweed.*
- **Trees:** Most trees that release symptom-causing pollens are *angiosperms* (which means *flowering seeds,* and yet these trees don't actually flower), such as willows, poplars, beeches, and oaks. Similarly, pollens from a few *gymnosperms* (naked seeds), such as pines, spruces, firs, junipers, cypresses, hemlocks, and cedars, can trigger symptoms of allergic rhinitis.

Although these plant groups account for most cases of pollen-induced allergic rhinitis, only a small percentage of the members of each group has been shown to produce allergenic pollen.

Blowin' in the wind

Wind pollination has worked well for certain plants for millions of years, enabling many of them to survive and flourish in environments that don't provide many insect or animal pollinators. Humans have also flourished in these areas, with the result that we're often in the pollen path of wind-pollinating plants. Instead of wind-borne pollen granules reaching their intended targets, they often end up in our eyes, nose, throat, and lungs, causing allergic reactions in susceptible individuals.

Pollens (and molds) for all seasons

Most wind-pollinating plants in the United States and Canada release their pollens at specific times during the year that can be classified into five pollen seasons. Whenever your respiratory symptoms begin or worsen during one of these seasons, the predominance of particular pollens during that particular time of year may be the cause of the allergic reactions that complicate your asthma. Following are the types of pollens (or molds) that may affect you in each of the five pollen seasons:

- When your symptoms get worse during spring, the probable cause is tree pollen.
- In late spring and early summer, grass pollen is the likely culprit.
- From late summer to autumn, weed pollen, especially from ragweed, may cause you problems.
- Mostly during summer and fall but also throughout the year — except during snow cover — mold spores, particularly those of airborne molds, may trigger your allergies.

DEAD WOOD

Although you may experience respiratory symptoms when you're exposed to the pollen of certain grasses, weeds, or trees, that doesn't mean you're allergic to the pollinating plants themselves. When you're allergic to oak pollen, you're not allergic to the actual oak tree. You're only allergic to the pollen granules produced by the tree. Therefore, even though oak pollen may trigger your asthma symptoms, you can use furniture made from the wood of the tree. That antique oak desk in your study won't trigger your allergies — it stopped pollinating a long time ago.

» In winter, wind-borne pollens rarely are a factor in most parts of the United States and Canada. However, in the warmer southern regions of the United States that don't experience prolonged periods of freezing temperatures (such as Southern California), pollinating plants and molds still release allergy-triggering pollen and mold spores when there's no snow cover.

When your allergic rhinitis symptoms follow a seasonal pattern, such as those just listed, consult your doctor to find out whether specific pollens are the problem. You may also want to ask your doctor for information on the major aeroallergens for the area 50 to 100 miles around where you live and work.

Climate change

Warming temperatures and rising carbon dioxide in the air from the use of fossil fuels are resulting in longer and more intense pollen seasons. These more intense pollen seasons can lead to increased allergy symptoms in children and adults.

TAKE MY POLLEN, PLEASE!

Plants that are the main culprits in allergic rhinitis depend on wind pollination because they're not pretty or colorful enough to attract insects or other animals to do the pollinating. Most flowers that appeal to people — and to insects and other animals — produce heavier pollens that stick to the insects or animals that carry it to female plant reproductive sites, so you're far less likely to acquire sensitivities to pollen from roses or other attractive, colorful plants, unless you're in constant, close contact with their flowers. When you experience allergy symptoms after stopping to smell the roses, pollens from nearby grasses, weeds, or trees may cause your reaction.

Non-natives

A list of local allergenic plants can serve as a good starting point for figuring out which plants may be affecting your allergies. However, knowing about non-native plants in your environment is also useful. Non-native plants in your environment often include trees and grasses — some of which may produce allergenic pollen — that were planted around your community for decorative purposes.

Counting your pollens

Many newspapers and television and radio news programs regularly report pollen counts. The *pollen count* is the measurement of the total number of granules of a particular pollen per cubic meter of air per day. Pollen counters rate the resulting numbers according to five categories, ranging from absent to very high.

Running the numbers

Bear in mind that the severity of symptoms triggered by pollens depends not only on the actual pollen count but also on the particular pollen being measured. In addition, the distance of the collection station from the particular pollen being monitored usually affects the actual count, and each region of the world has its own predominant allergy-producing pollens. Table 7-1 provides the generally accepted guidelines for interpreting pollen counts for ragweed, which is the most closely followed pollen count in many parts of the United States and Canada.

TABLE 7-1 Ragweed Pollen Count Guidelines

Category	Pollen Grains Per Cubic Meter Per Day*	Degree of Symptoms
Absent	0	No symptoms.
Low	0–10	Only people with extreme sensitivities to these pollens may have symptoms.
Moderate	10–50	Many people who are sensitive to these pollens experience symptoms at this rating.
High	50–500	Most people with any sensitivity to these pollens experience symptoms.
Very High	More than 500	Almost anyone with any sensitivity to these pollens experiences symptoms. If you're extremely sensitive to ragweed pollen, your symptoms can be severe at this level.

**These figures are averages.*

REMEMBER

Here are some other factors to keep in mind when reading a pollen count:

- Today's pollen count was collected yesterday and usually reflects what was in the air 24 hours ago.
- Rain can clear pollen out of the air temporarily. However, short thunderstorms — the kind that are characteristic of late spring and summer in parts of North America — can actually spread pollen granules farther.
- Hot weather increases pollination, whereas (you probably figured this one out already) cooler temperatures reduce the amount of pollen that plants produce.
- Pollen grains typically are at their highest concentrations from midmorning to early afternoon.
- Because they're wind-borne, many pollen granules travel great distances, so the plants in your backyard or your neighbor's garden may not be what's triggering your allergies. Chopping down the olive tree in front of your house may have little, if any, effect on your allergies.

Assessing quality, not quantity

REMEMBER

Not all pollens are equal. Studies show that a little pollen from grasses such as Bermuda and bluegrass or trees such as oak and elm can go a long way in triggering allergies. On the other hand, allergic rhinitis symptoms usually are triggered by much higher and direct exposures to pine and eucalyptus pollens, which are large and heavy and don't disperse widely in the wind. Similarly, a moderate ragweed pollen count typically has far more effect than a high English plantain count, depending on your sensitivity to those pollens. So knowing the types of pollens that are blowing in the wind, and how much of those pollens are actually in the wind, is important.

GO WEST, YOUNG POLLEN!

Doctors used to tell patients with asthma and allergies to move to Arizona because of the area's dry climate and sparse plant population. Through the years, plenty of folks have indeed moved to Arizona (and not just because of a doctor's recommendation). Many of Arizona's new residents decided to plant ornamental non-natives, such as mulberry trees, to spruce up the desert scenery. Mulberry trees thrive in the hot, dry climate and produce clouds of allergenic pollen. As a result, Phoenix and other cities in the state are now major allergy centers. In fact, some of the busiest allergists in the United States practice in Arizona.

TIP

Consider the following tips to help you minimize problems during high pollen–count days:

- When your community reports high counts for pollens to which you are allergic, take steps to avoid or reduce your exposure to those pollens. For details on how, see "Avoiding Triggers and Allergy-Proofing Your Environment," later in this chapter.
- If complete or significant avoidance isn't practical or possible, use pollen counts to help you determine (based on your doctor's advice) when to take medication to prevent the onset of symptoms or at least keep them from interfering dramatically with your life.
- The most important pollen levels to consider are the ones that trigger your allergies. Many people react differently to different levels of airborne pollen, and pollens vary between regions. You need to be concerned when pollen counts reach the moderate range because that's generally when many people with allergies start to experience symptoms.

TIP

Contact the National Allergy Bureau (NAB) of the American Academy of Allergy, Asthma & Immunology for more information about the pollens and molds in your area. Check out the NAB website at `https://pollen.aaaai.org/#/` or call 414-272-6071. Other sources about pollens and molds in your area can include local newspapers and television stations (see "Running the numbers" earlier in this section).

Allergens in the grass

Grass pollens are the most common cause of allergies in the world. Although only a small percentage of the more than 1,000 species of grasses in North America produce pollen that triggers asthma symptoms and allergic reactions, these particular species are widespread throughout the continent and release huge amounts of pollen granules into the air. Most of these allergy-triggering grasses are nonnative plants that were imported to grow feed for farm animals and to plant lawns.

Wind-pollinated grasses release vast amounts of pollen granules during the late spring pollen season. The most significant allergy symptom–provoking grasses are Bermuda grass, bluegrass, orchard grass, ryegrass, timothy, and fescue. Of those grasses, Bermuda grass may be the most significant allergy trigger. Bermuda grass releases pollen almost year-round and abounds throughout the southern United States, where it's cultivated for ornamental purposes and as animal feed. Other grasses, such as rye, timothy, blue, and orchard, have allergens in common, so an allergy to pollen from one of these grasses may indicate sensitivity to allergens from one or more of the others.

Wheezy weeds

Weeds are plants, too — many people just don't consider them desirable plants. For the sake of allergies, however, when we refer to *weeds,* we mean the small, wild annual plants of no agricultural value or decorative interest. The wind-pollinated weeds that release allergenic pollen don't produce very attractive or conspicuous flowers. The most significant of these wind-pollinated weeds, in terms of allergic triggers, include ragweed, mugwort, Russian thistle, pigweed, sagebrush, and English plantain.

REMEMBER

Ragweed is a significant trigger of asthma symptoms and the most common cause of allergic rhinitis in North America. Many people who are sensitive to ragweed may experience cross-reactivity to cocklebur. (See "Crossing the line," later in the chapter, for more information on cross-reactivity.)

In the United States, from the mid-Atlantic to northern parts of the Midwest, where ragweed is most concentrated, pollination usually begins around August 15 and generally lasts through October (or until the first frost), depending on climate conditions. Ragweeds are early risers, with most plants releasing pollen between 6:00 a.m. and 11:00 a.m. Hot and humid weather usually leads to an increased release of pollen.

Although ragweed pollen is most prevalent east of the Mississippi River, you can find related weed pollens, such as those produced by marsh elder and cocklebur, throughout most parts of North America.

Can't sneeze the forest for the trees

Of the 700 species of trees that are native to North America, only 65 produce pollen that triggers allergic rhinitis. The pollination season for most of these species usually runs from the end of winter or the beginning of spring until early summer.

Pollens from these types of trees have much shorter ranges than the pollens that wind-pollinating grasses and weeds release. As a result, in most cities and towns, weed and grass pollens are far more likely to affect you than tree pollens. However, in the southeastern United States, the spring tree season is a major problem, with high peaks of pollination over a prolonged time period.

Trees that produce the most allergenic pollen in North America include elms; willows and poplars; birches; beeches, oaks, and chestnuts; maples and box elders; hickories; mountain cedars; and ashes and olives.

RAGWEED TO STARBOARD, CAPTAIN!

Is that seasickness or allergies? Ragweed pollen has such a broad range that it has been detected 400 miles out to sea. So if you're on the ocean during ragweed season, you should take your medication with you. (Make sure it's the nondrowsy formula, especially when you're at the helm.)

Managing Molds

Talk about moldy oldies: Molds are some of the oldest and most common organisms on the planet, and they're widespread in most homes. Think of molds as microscopic *fungi*, or mushrooms. You've probably encountered various forms of mold at home, from splotches on your shower door, to the greenish growth on that tomato you forgot in the back of your fridge last month.

As far back as 1726, mold spores were suspected of being a source of respiratory symptoms. Throughout the United States and Canada, mold spores are some of the most common inhalant allergens, outdoors and indoors, and can be significant triggers of asthma, allergic rhinitis, and other respiratory ailments.

Mold counts usually are much higher than pollen counts and typically rise to peak levels during summer months. Outdoor mold spores are present almost year-round unless prolonged snow cover occurs. This mold-spore abundance contrasts with pollens, which are usually released by plants only during distinct seasons. However, at any time, mold counts can suddenly and dramatically rise within a short period and then drop to previous levels just as abruptly. Because molds also thrive indoors, you may be exposed to mold spores continuously throughout the year.

Outdoor molds grow on field crops such as corn, wheat, and soybeans; on decaying organic matter such as compost, hay, piles of leaves, and grass cuttings; and on decaying fruits and vegetables, including tomatoes, melons, bananas, and mushrooms.

As is true of grasses, weeds, and trees, only a few types of molds produce allergens that trigger asthma and allergic rhinitis symptoms. Airborne mold spores occur almost everywhere on the planet except at the North and South poles. So unless you're a polar bear or a penguin, odds are good that you have some degree of

exposure to mold particles, regardless of where you live. Common allergenic molds include

- **Cladosporium:** These molds produce some of the most abundant windborne spores in the world and flourish almost everywhere, except in the coldest regions.
- **Alternaria:** These outdoor molds are among the most prominent causes of allergy symptoms in sensitized people.
- **Aspergillus:** This is a medically important indoor mold, found in agricultural areas, crawl spaces of homes, and even outdoor air throughout North America. A variety of allergic respiratory diseases are associated with exposure to aspergillus, including allergic asthma (see Chapter 6), hypersensitivity pneumonitis (*farmer's lung*), and a serious ailment known as *allergic bronchopulmonary aspergillosis,* or ABPA. Infection with aspergillus is more likely to develop in individuals with asthma or an underlying lung disease. ABPA is not contagious and cannot be transmitted from one person to another.
- **Penecillium:** Although this mold was the original source of the antibiotic penicillin, modern penicillin antibiotics do not contain the mold particles. If you or your doctor have any concerns about the possibility that you might have a penicillin allergy, you might need to be tested for that specific allergen, which is a separate allergy from the one associated with the mold penecillium. Always consult with your physician before taking any new medications.

TIP

Here are some factors that can help you determine whether mold spores are triggering your respiratory symptoms:

- You experience asthma and allergic rhinitis symptoms most of the year, rather than during specific seasons.
- Your symptoms worsen during summer months, even when pollen allergens aren't present to any significant degree.
- Your asthma or allergies worsen near croplands, especially around grains and overgrown fields, or during or immediately after gardening.

Handling House Dust

House dust may be the most prevalent of all triggers of respiratory symptoms in your life. Recent studies show that the major inhalant allergens found in house dust can be the most important risk factors in triggering asthma attacks.

Let us reassure you: Dust isn't dirt, and it isn't an indication of poor housekeeping. Even if you're a clean freak and keep your house immaculate, odds are, whenever you go away for a week, you'll return to find a coating of dust on most surfaces, even if you sealed up the place and nobody has visited. Household dust is inescapable because it's a normal breakdown product of fibers and other materials found throughout your indoor environment.

Common components of house dust include

- Dust mite allergens
- Animal dander
- Insect fragments
- Fibers from acrylic, rayon, nylon, cotton, and other fabrics
- Wood and paper particles
- Hair and skin flakes
- Tobacco ash
- Particles of salt, sugar, spices, and minerals
- Plant pollen and fungal spores

Dust mites

The most potent allergen in house dust comes from the dust mite (*Dermatophagoides pteronyssinus* or *Dermatophagoides farinae*, depending on where you live). Check out Figure 7-1 to see a dust mite. These eight-legged microscopic spider relatives live in house dust, where they feed on dead skin flakes (hence the scientific name *dermatophagoides*, meaning skin-eater; but don't worry — dust mites don't eat living skin) that warm-blooded creatures (such as humans) constantly shed at rates of up to 1.5 grams per day — that's a lot of dust mite chow.

The fecal matter (or waste, to put it more delicately) they produce, at an average rate of 20 particles per day, is the most prevalent form of house dust allergens and often causes respiratory problems in humans.

Eighty percent of patients with allergies test positive for sensitivity to the dust mite allergen. Because dust mites usually are as snug as bugs in a rug, people rarely come into direct contact with the live creatures themselves — just with their waste or decomposing bodies, which also can be a significant source of house dust allergens. Dust mites thrive in dark, warm, and humid environments such as mattresses, pillows, box springs, rugs, towels, upholstered furniture, drapes, and stuffed toys.

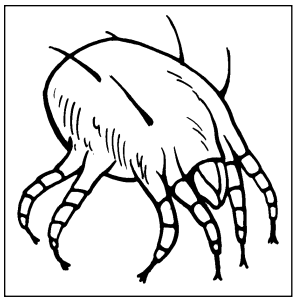


FIGURE 7-1: Dust mites are among the most abundant sources of allergic triggers.

REMEMBER

Mattresses and box springs usually provide the greatest concentration of human skin flakes for these creatures, which is why the average bed contains 2 million dust mites. Your asthma or allergy symptoms may worsen in bed or during a nap on your upholstered couch because you inhale significant amounts of dust mite allergens while sleeping. That's why many of the steps we recommend for your home in "Avoiding Triggers and Allergy-Proofing Your Environment," later in this chapter, focus on your bedroom.

If you wonder about the seriousness of dust mite infestations, consider this study: Dust mites were stained with a dye and then released on a couch in a home. (The family gave informed consent for the experiment.) By the next day, the dust mites had infested the family car, and some of the creatures were found on the clothes of family members who sat on the couch. Within ten days, marked dust mites were recovered from every room in the house.

In another experiment, dust mites in an infested rug were killed and the rug was cut into pieces and stored at different combinations of temperature and humidity. Almost two years later, the allergens from the dead mites were as potent as they originally were, showing that they thrive in humid environments and room temperatures.

Cockroaches

Recent studies increasingly show that allergens in cockroach debris and waste can contribute to asthma attacks, especially in children (see Chapter 6). Similar to other allergens, such as cats, dogs, and pollens, exposure to cockroaches can cause significant allergies. Research has shown that enzymes found in proteins in cockroaches cause allergic reactions and that these proteins are found in the saliva and waste of these insects. These cockroach allergens can easily spread through the home much like dust — for example through heating and air conditioning vents, trash containers, and anywhere unsealed food is stored. Your doctor may recommend allergy testing to see if you react to cockroaches, and they can provide you with treatments to alleviate your respiratory symptoms.

Other pesky dust contributors

Dander from household pets is another major trigger of respiratory symptoms. Although you may not have pets of your own, when you're in contact with other pet owners, dander from their animals can get on your hands or clothes, which you then introduce into your home. In addition, the urine from household pests, such as mice and rats, can be significant triggers of asthma symptoms and allergic reactions.

Dust gets in your eyes . . . or nose, throat, and lungs

TIP

You can use the following list to determine whether inhalant allergens in house dust trigger your respiratory symptoms:

- You experience asthma or allergy symptoms as a result of dusting, making beds, or changing blankets and bed linens.
- Your symptoms seem to occur year-round rather than seasonally.
- Your symptoms are worse when you're indoors.
- Your symptoms are worse when you wake up in bed in the morning.

Avoiding Triggers and Allergy-Proofing Your Environment

Early on, our human ancestors realized that getting out of the elements and into some type of shelter was a key aspect of surviving the dangers and challenges of the prehistoric world. For the most part, humans have become indoor creatures, progressing from cave and tree dwellings to houses and apartments, malls, and tightly sealed office buildings. In their dwellings, most people have the means of shielding themselves from the adversities of weather and climate, and they're safe (for the most part) from predators.

One of the downsides of modern structures is that indoor environments — at home, work, school, and even in cars and other enclosed means of transportation — can often contain far more significant sources of asthma and allergy triggers than outdoor environments. Irritants and allergens can concentrate in most enclosures, and because people spend so much time indoors, that's where they often experience the most significant exposure to allergy triggers.

Energy-conservation building codes adopted in the United States since the 1970s have worsened the concentration of allergens within structures, because airborne particles that contain allergens and irritants often remain trapped indoors. Although we're certainly in favor of energy-efficient structures, you need to ensure that the air you breathe inside — especially at home — is as safe as possible.

Avoiding — or at least significantly decreasing your exposure to — substances in your environment that trigger your asthma attacks and allergic reactions often helps relieve your symptoms and thus improves your overall health. These avoidance measures also can reduce your need for medication or shots, thereby saving you much time and money. The guidance we provide in this section shows you how to avoid and control indoor air pollution.

Understanding why avoidance matters

You've probably heard the joke about the patient who complains, "Doc, it hurts when I do this," to which the doctor replies, "Then stop doing that." Silly as that joke seems, the doctor's advice exemplifies the basic concept of avoidance. Depending on your sensitivity, avoid the substances or levels of exposure to the substances that trigger an allergic reaction (that's why such substances are called *triggers*).

Avoidance seems simple enough. In real life, however, the trick is figuring out — short of living in a bubble — the practical and effective steps you can take to minimize your contact with allergy triggers.

Developing an avoidance checklist

Environmental control measures are vital components of any allergist's treatment plan. An allergist focuses on helping you create and implement an effective avoidance strategy for you, your spouse, your child, or other people with asthma who live with you. The plan you and your allergist develop will likely include these general steps:

1. **Identify asthma and allergy triggers in your environment, especially indoor allergens and irritants.**
2. **Recognize situations in which you may come into contact with those triggers.**
3. **Discover how to avoid allergens or minimize contact with them.**
4. **Allergy-proof your home.**

Taking time for terminology

In case you're allergic to jargon, the following list explains common technical terms that allergists use when discussing avoidance and allergy-proofing:

- **Allergen load:** Your total level of exposure, at any given time, to any combination of allergens that trigger your allergies.
- **Allergic threshold:** Your level of sensitivity to an allergen. A low allergic threshold means your sensitivity to an allergen is high — even a small exposure to the substance can trigger your symptoms. A high allergic threshold means your body requires a higher concentration of allergens to trigger symptoms. Your allergic threshold can decrease when you're exposed too often to large quantities of an allergen or to a combination of allergens.
- **Allergy trigger:** A normally harmless substance, such as pollen, dust, animal dander, an insect sting, or a certain food or drug, that can provoke an abnormal response by your immune system when you're sensitized to that substance. Doctors usually refer to these substances as *allergens.*
- **Cross-reactivity:** Your immune system is an expert at recognizing related allergens in seemingly unrelated sources. With cross-reactivity, if you're exposed to related allergens within a short time, your allergen load can exceed your allergic threshold, thereby triggering allergic reactions and asthma symptoms.
- **Desensitization:** In the context of avoidance and allergy-proofing, *desensitizing* describes the active process of removing, shielding, or reducing the sources of allergens in your environment. Your allergist may advise you to desensitize your home, focusing especially on the bedroom of any person with asthma. *Desensitization* also refers to a form of treatment in which an allergist administers a small amount of an allergen extract by injection under your skin, or orally as a dissolvable tablet placed under your tongue, so your body can discover how not to react to the substance (see Chapter 11).
- **HEPA:** High-efficiency particulate arrester — an air filtration process developed for hospital operating rooms and other locations that require a sterilized environment. HEPA filters absorb and contain 99.97 percent of all particles larger than 0.3 microns (1/300 the width of a human hair). When the filter truly operates at that level, only 3 of 10,000 particles manage to sneak back into the room. Vacuum cleaners and air purifiers with ULPA (see the definition later in this list) and HEPA filters are vital tools for desensitizing and allergy-proofing your indoor environment. HEPA filters should be routinely replaced to ensure the system is working at peak effectiveness.
- **HVAC:** Heating, ventilation, and air-conditioning — your home's lungs. The quality of the air you breathe indoors is largely dependent on the condition of

your HVAC systems and the air that flows into and out of your environment through them.

- **ULPA:** Ultra-low particulate air filtering is even more thorough than the HEPA process. This filtration system is designed to absorb and contain 99.99 percent of all particles larger than 0.12 microns. As with HEPA, ULPA filters should be replaced regularly.

Knowing your limits

Avoidance measures rarely require the complete elimination of all asthma and allergy triggers and irritants in your environment. In many cases, you may only need to limit your exposure to certain triggers to prevent or alleviate your respiratory symptoms.

Think of your allergic threshold as a cup and the allergy triggers in your environment as liquid pouring into that cup. Overflowing your small cup (low allergic threshold) — triggering an allergic reaction — may require only a small amount of liquid (allergens). A larger cup — a higher threshold — can accommodate more liquid without overflowing (triggering an allergic reaction). Knowing your limit is the key to mastering your threshold.

Another important concept to bear in mind when considering avoidance is imagining a scale balancing your allergic threshold on one side with your allergen load on the other. You won't set off your allergies unless your level of exposure to allergen triggers overloads your allergic threshold. Keep in mind, however, that your scales can tip not only from excessive exposure to a single allergen but also from exposure to small amounts of a variety of allergens.

Crossing the line

Cross-reactivity is also an important factor in causing allergic reactions and asthma symptoms. It can contribute toward overloading your allergic threshold. For example, when you have sensitivity to ragweed, you may also be sensitive to allergens in melons — honeydew, cantaloupe, and watermelon.

This phenomenon occurs because, in some individuals, an allergenic cross-reactivity that exists between certain food proteins and nonfood protein sources can look alike to your immune system. As a result, in addition to ragweed allergy symptoms during ragweed season, you may experience itching and swelling of your mouth and lips when eating melons, even though these fruits may not present a problem for you during the rest of the year. Some people also experience allergic cross-reactivity between latex and — of all things — bananas, avocados, papaya, kiwi, and chestnuts.

INDOOR AIR POLLUTION: EVERY BREATH YOU TAKE CAN HURT YOU

If you have asthma or allergic rhinitis, you may focus your attention on pollen counts, air pollution, and other elements of the outdoor environment as the prime sources for allergens and irritants that trigger your symptoms and reactions. You may also assume that indoor air is cleaner and safer than the air you breathe outside. However, according to U.S. Environmental Protection Agency studies, indoor air can contain as much as 70 times the pollution of outdoor air.

According to the American Lung Association, most people spend 90 percent of their time indoors, and 60 percent of that time at home. Therefore, indoor air pollution is a serious concern for everyone, particularly because studies show that it can cause or aggravate asthma and allergies.

Allergy-proofing your home

Allergen avoidance begins at home. Although we certainly advise you to avoid or limit exposure to allergens and irritants outside, at work, at school, or in other indoor locations, avoidance therapy can have the most beneficial impact in your home. Even when you're exposed to allergy triggers outside your home, reducing your exposure to those allergens and irritants at home may prevent your allergen threshold from overloading.

On average, most people spend a third of their lives in the bedroom — much of that time in bed. As a result, the bedroom is the most important single area of your home. After allergy-proofing your bedroom, try using it as much as possible to ensure that you give your allergies a rest.

In and around your home, the most common and significant sources of allergens you need to focus on when allergy-proofing are

- Dust and dust mites
- Pets
- Mold
- Pollen

Controlling irritants at home is also vital to successful avoidance therapy. Although these substances don't trigger allergic responses by your body's immune system (as is the case with allergens), they often worsen existing asthma or allergy conditions.

REMEMBER

Tobacco smoke is the most significant irritant found in the home that aggravates allergy and asthma reactions. Other important irritants, in alphabetical order, include

- Aerosols
- Glue
- Household cleaners
- Paints
- Perfumes and scents
- Scented soaps
- Smoke from wood-burning stoves

The basics of allergy-proofing are illustrated in Figure 7-2 and explained in more detail in the sections that follow.

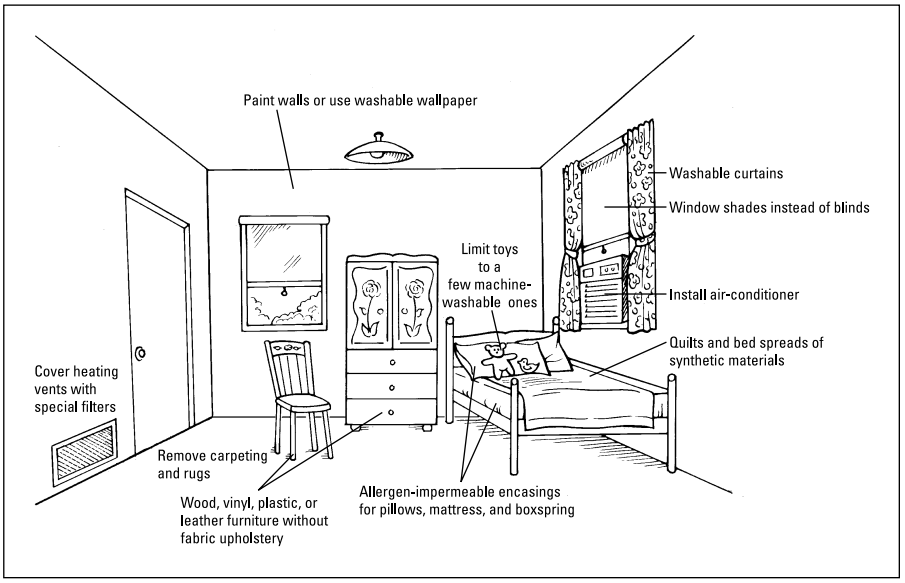

Paint walls or use washable wallpaper
Washable curtains
Window shades instead of blinds
Limit toys to a few machine-washable ones
Install air-conditioner
Quilts and bed spreads of synthetic materials
Cover heating vents with special filters
Remove carpeting and rugs
Wood, vinyl, plastic, or leather furniture without fabric upholstery
Allergen-impermeable encasings for pillows, mattress, and boxspring

FIGURE 7-2: An allergy-proofed bedroom.

Controlling dust in your home

Studies show that the average six-room home in the United States collects 40 pounds of dust each year. House dust is one of the most prevalent asthma and allergy triggers in any home, and unfortunately, it's everywhere. Think of house dust as one of life's inevitabilities — along with death and taxes. Here are some

suggestions for dealing with the dust in your house (also see "Controlling dust mites throughout your home" later in this chapter).

- Dust with damp microfiber cloths and vacuum regularly.
- Make sure to dust tabletop counters, shelves, and other smooth surfaces.
- Remove shoes when entering your home.
- Have your air ducts cleaned on a consistent schedule.
- Use an air purifier and change the air filters regularly.
- Keep your windows closed to reduce exposure to dust in your home.
- Avoid ceiling fans because they can easily become dust collectors.
- Eliminate carpeting, which is a major indoor source of allergens. Bare surface flooring, such as hardwood or stone, is easier to keep dust free.
- Clean window blinds regularly.
- Most of all, keep your home uncluttered. Books, bookcases, shelves, knick-knacks and tchotchkes are notorious dust collectors.

Controlling dust mites throughout your home

Allergy-proofing your home likely involves dealing with dust mites more than any other allergy trigger, because these microscopic creatures produce the single largest component of house dust that triggers respiratory symptoms in asthma patients. Although you've probably never seen them, dust mites are a fact of life — they're bound to follow almost anyplace you settle.

Few of us ever go to bed alone. Dust mites thrive in dark and humid environments such as mattresses, pillows, and box springs. In fact, the average bed contains 2 million dust mites, which means you may breathe in significant amounts of dust mite allergens while you sleep. Dust mites also survive well in blankets, carpets, towels, upholstered furniture, drapery, and stuffed toys.

Although completely getting rid of these natural inhabitants of your home is virtually impossible — the females lay 20 to 50 eggs every three weeks — you can take practical and effective steps to minimize your exposure to dust mite allergens.

TIP

Taking the following measures often results in a significant decrease in respiratory symptoms and medication requirements for patients with asthma and allergies:

- **Beds:** Encase all pillows, mattresses, and box springs in special allergen-impermeable casings, and mount all beds on bed frames. Wash all bed linens

in hot water (at least 130 degrees) every week. Consider using hypoallergenic pillows, blankets, quilts, and bedspreads that are usually formulated with a protective outer barrier that work to keep out dust mites and other allergens (see "Dealing with dust mites" in Chapter 4).

- **Temperature and climate control:** Don't locate your bedroom in a warm (more than 72 degrees), humid area. Likewise, use air conditioners or dehumidifiers to keep the humidity in your home below 50 percent. You may want to use a humidity gauge to monitor humidity levels.
- **Carpets and drapes:** Whenever possible, go for the bare look in your home — remove carpeting and thick rugs. Bare surfaces such as hardwood, linoleum, or tile floors are inhospitable to dust mites and are also much easier to clean, thereby minimizing dust buildup. If you can't remove your carpeting and rugs, treat them with products that deactivate dust mite allergens. We also recommend washable curtains or window shades rather than heavy draperies or blinds.
- **Housekeeping:** Vacuum thoroughly, at least once a week, with a HEPA or ULPA vacuum cleaner (see "Taking time for terminology," earlier in this chapter). If you have allergies, wear a dust mask when cleaning or engaging in any activity that stirs up dust, and consider cleaning your furniture with a tannic acid solution. Experts recommend that you dust with a damp microfiber cloth prior to vacuuming.
- **Ventilation:** Use HEPA air cleaners to keep the indoor air throughout your home as pure as possible (see "Taking time for terminology," earlier in this chapter). Cover any heating vents with special vent filters to clean the air before it enters your rooms. The efficiency of air cleaners varies with the allergen in the environment. For example, light allergens, such as cat allergens that float in the air, are filtered better than heavy allergens, such as house dust, which remain close to the ground.
- **Decorations and furnishings:** Use furniture made of wood, vinyl, plastic, and leather throughout your home rather than furniture covered with upholstery. Likewise, make your bedroom as uncluttered and wipeable as possible. Avoid shelves, pennants, posters, photos or pictures, heavy cushions, and other dust collectors. Limit the clothes, books, and other personal objects in your bedroom to the essentials, and make sure you shut things inside closets or drawers when you're not using them.

  If your child has allergies or asthma, don't turn their bedroom into a stuffed animal zoo. Instead, try limiting plush toys to a few machine-washable ones. Keep your child's stuffed animals and toys in the closet or in a closed chest, container, or drawer when they're not in use.

Regulating pet dander

Pets are cherished members of many households. However, animal *dander* (skin flakes) is a significant source of allergy triggers for many people. All warm-blooded household pets, regardless of their hair length, produce proteins in their dander and saliva that can trigger allergies. Dead skin cells in pet dander can even serve as a food supply for dust mites. Cat dander residue can linger at significant exposure levels in carpets for up to 20 weeks and in mattresses for years, even after you remove the animal.

AUTHOR SAYS

We usually advise people with asthma or allergies not to introduce new pets into their home. If you already have a pet, we realize that removing this member of the family can be a very emotional issue for you and other household members, even though Fluffy or Fido's dander may be triggering your respiratory symptoms or those of your children.

TIP

If finding a new home for your pet isn't likely, we advise the following measures:

- Keep your pet outdoors whenever possible. If keeping your pet outdoors isn't possible, try to keep your furry friend out of the bedrooms. Also consider running a HEPA or ULPA air purifier 24 hours a day in the bedrooms and keeping bedroom doors closed at all times.
- Make sure anyone who touches your pet washes their hands before coming in contact with the asthma or allergy sufferer or entering that person's bedroom.
- Wash your pet with water once a week. This may remove surface allergens and possibly reduce the amount of dander that can stick to other household members' clothes and bodies (thereby reaching the bedrooms). Although it may take some training (and a few scratch marks), even cats can get used to baths.

Controlling mold in your abode

Molds release fungal spores into the air. These spores settle on organic matter and grow into new mold clusters. When inhaled by sensitized individuals, airborne spores can trigger allergic symptoms. Airborne mold spores are more numerous than pollen grains, and unlike pollen, they don't have a limited season. In many parts of the United States and Canada, mold spores may be present until the first snow cover.

Outdoor mold spores can enter your home through the air, by blowing in open windows and doors, and through vents. Indoor molds can grow year-round, and they thrive in dark, humid areas of the home, such as basements and bathrooms. Molds also grow under carpets and in pillows, mattresses, air conditioners, garbage containers, and refrigerators. The older your home, the larger the amount of mold that grows there.

TIP

Limiting your exposure to mold spores is a key part of allergy-proofing your home. We advise the following actions for controlling molds in and around your home:

- Avoid damp areas of your home, such as an unfinished basement or a room with a water leak. Or use a dehumidifier to lower humidity in those areas to 35 percent to 40 percent.
- Make sure your clothes dryer vents outside.
- Ventilate your bathroom well, especially after taking showers or bathing.
- Use mold-killing and mold-preventing cleaning solutions behind the toilet, around the sink, shower, bathtub, washing machine, and refrigerator, and in other areas of your home where water or moisture collects.
- Clean any visible mold from the walls, floors, and ceilings by using nonchlorine bleach.
- Take out the trash and clean your garbage containers regularly to prevent mold growth.
- Dry out damp footwear and clothing in which mold can breed. Don't hang clothes outside, where they can become landing areas for mold spores.
- Limit the number of houseplants you have in your home or remove them altogether because mold may grow in potting soil. Dried flowers may also contain mold, so get rid of them, too.

TIP

If you have allergies or asthma, avoid exposure to outdoor molds around your home. These molds proliferate in fallen leaves, compost, cut grass, fertilizer, hay, and barns. When you must work in your yard, wear a well-fitting face mask. Cut back any heavy vegetation around your home to enable the structure to breathe and to prevent dampness and mold growth.

Pollen-proofing precautions

Allergic rhinitis is perhaps the best-known allergy of all. Many people associate this type of allergy primarily with outdoor exposure to pollen. However, you may also encounter significant levels of pollen inside, and these exposures can trigger allergic rhinitis symptoms.

Most pollens are wind-borne, and they often blow indoors (typically through open windows and doors), where they trigger allergic symptoms. Wind-pollinated trees, grasses, and weeds produce pollen during various times of the year. For details about pollen counts and contact information for obtaining reports on local pollen and mold conditions from the NAB, see "Counting your pollens," earlier in this chapter.

TIP

Take the following precautions, especially during periods of high pollination, to avoid excessive exposure to pollen:

- Avoid intense outdoor activities, such as exercise or strenuous work, during the early morning and late afternoon hours, when pollen counts are highest. When you need to work outside, wear a pollen and dust mask.
- Close windows and run a HEPA or ULPA air purifier.
- Clean and replace your air conditioner filters regularly and frequently replace HEPA and ULPA filters for your home's HVAC system.
- Wash your hair before going to bed to avoid getting pollen on your pillow.
- Use a clothes dryer rather than hanging the wash outside, where it acts as a filter trap for pollen. You may like the idea of laundry dried in the fresh air, but your nose, eyes, or lungs many not enjoy the allergic reactions all the fresh pollen triggers — especially when you hang sheets and pillowcases out on the line.

IN THIS CHAPTER

- Categorizing adverse food reactions
- Investigating allergic and nonallergic food hypersensitivities
- Understanding how food intolerance differs from food hypersensitivity
- Getting medical attention for severe food reactions
- Preventing allergic food reactions

Chapter 8

The Role of Food Allergies

If the food you eat bites you back with fits of wheezing, outbreaks of eczema, episodes of gastric distress, or other symptoms (perhaps even including life-threatening bouts of anaphylactic shock), you're not alone. Adverse food reactions affect at least one in four Americans at some point in their life. Food allergies can even trigger asthma symptoms that, in some cases, cause life-threatening respiratory symptoms in certain susceptible asthmatics.

Between 4 percent and 8 percent of children with asthma have a food allergy, while about half of children with a food allergy will experience respiratory symptoms during an allergic reaction. The risk of anaphylaxis (a severe allergic reaction that can be life-threatening) appears to be closely linked to the severity of asthma. In comparison to the general population, people with asthma and food allergies have a much higher risk of anaphylaxis (anna-fih-*lack*-sis).

However, not all food ingredients that can cause adverse reactions are triggers of *food hypersensitivity* (the more precise term for *food allergy*). Even though 40 percent of Americans believe their unfortunate gastronomical experiences result from allergies to certain foods, most cases involve various forms of food intolerance, food poisoning, and other types of nonallergic conditions.

In this chapter, we discuss the different types of adverse food reactions, and we also explain the differences between allergic and nonallergic food hypersensitivities. In addition, we compare food allergies versus food intolerance and review how adverse food reactions are properly diagnosed. Then we give you some insight into recent developments in treating food allergies.

Understanding Adverse Food Reactions

Because the range of adverse food reactions can include a constellation of nasal, respiratory, dermal (skin), gastrointestinal, and oral symptoms occurring separately or in combination, doctors usually classify these reactions according to the mechanisms they involve.

REMEMBER

The following list summarizes the two main classifications of adverse food reactions:

- **Food hypersensitivity:** These reactions occur when your immune system responds to specific proteins in certain foods. The reactions can include allergic mechanisms involving immunoglobin E (IgE) antibodies (see Chapter 3) as well as nonallergic mechanisms.
  - Allergic food hypersensitivities include gastrointestinal tract allergies, hives and other allergic skin reactions, and even *anaphylaxis* (a severe, abrupt reaction that affects many organs of the body simultaneously and can be life-threatening).
  - Nonallergic food hypersensitivities (sometimes referred to as *non-IgE food reactions*) include syndromes such as food-induced enterocolitis, colitis, and malabsorption, as well as celiac disease, dermatitis herpetiformis, and pulmonary hypersensitivity. We discuss these medical conditions in greater detail in "Nonallergic food hypersensitivities," later in this chapter.
- **Food intolerance:** These types of reactions result from nonallergic, nonimmunologic responses to offending substances in various foods. Forms of food intolerance include
  - Lactose intolerance
  - Pharmacologic food reactions
  - Metabolic food reactions
  - Food additive reactions
  - Food poisoning
  - Toxic reactions

A common cause of confusion with food allergy in adults are the presenting signs of irritable bowel syndrome (IBS). This condition is characterized by a group of symptoms that often occur simultaneously, including pain in the abdomen, bloating, and troublesome changes in bowel movements, which may include diarrhea, constipation, or both. Some patients with IBS can control their symptoms by managing their diet and lifestyle and by minimizing stress. However, many patients require medical care and pharmacologic therapy.

The number of people with food allergies in the United States has doubled in each of the last decades. Although allergic reactions to food can be severe (and should be appropriately diagnosed and managed), the number of adults in the United States who suffer from true food hypersensitivities is close to 10 percent of the population. Moreover, food allergies may affect as many as 8 percent of infants and children, with allergic reactions to peanuts topping the list of triggers of severe — even life-threatening — respiratory symptoms in some children with asthma. According to one recent study of life-threatening asthma attacks, half the children hospitalized in these cases had food hypersensitivities, especially to peanuts.

Allergic food hypersensitivities

In the case of *IgE-mediated food hypersensitivity*, commonly known as a *food allergy*, your immune system cooks up specific IgE antibodies (see Chapter 11) against certain allergens. The level of exposure required for your immune system to be sensitized to a particular food varies, depending on the allergens involved. The nine major food allergens that have been identified, and which represent 90 percent of food allergies, are mostly proteins in the foods in the following list. These nine major food allergens must be listed clearly in plain language by federal law when sold in the United States. These food labels must accurately identify the food source names of any ingredients that are one of the major food allergens or that contain protein derived from the food allergen:

- Peanuts (the leading cause of severe allergic food reactions), peas, lentils, beans, and other legumes, as well as foods containing products derived from legumes as ingredients. A wide variety of foods contain peanut products as ingredients, including chocolate, candy bars, trail mixes, egg rolls, dipping sauces, and ice cream. See "Anaphylaxis and allergic food reactions," later in this chapter, for more information on peanut issues. Likewise, you can find details on uncovering hidden allergenic ingredients in many common foods in "Avoiding Adverse Food Reactions," later in this chapter.
- Soybeans, which are also legumes, often act as hidden triggers of food allergies. Soybeans can be divided into fermented and unfermented foods. Unfermented soy products include tofu, soy milk, edamame, and sprouts. Fermented foods include soy sauce, tempeh, and miso.

- Shellfish, such as shrimp, lobster, crab, clams, and oysters.
- Fish — both freshwater and saltwater.
- Tree nuts, including almonds, Brazil nuts, cashews, hazelnuts, and walnuts.
- Eggs, especially egg whites, which contain the predominant allergenic proteins, ovalbumin and ovomucoid. The egg yolk is less allergenic than the white.
- Cow's milk and products that contain milk protein fractions, such as *casein* (80 percent of the protein in cow's milk) and whey, which includes lactalbumin and lactoglobulin.
- Wheat, an important ingredient in bran, malt, wheat flour, graham flour, wheat germ, and wheat starch. Corn, rice, barley, oats, and other grains and cereals are less common food allergy triggers.
- Sesame, including sesame seeds, hummus, tahini, sushi, and cereals such as muesli and granola.

Of these culprits, the products that trigger allergic food reactions in children most frequently are milk, eggs, peanuts, tree nuts, fish, soy, and wheat. In adults, the likeliest causes of allergic food reactions include fish, shellfish, peanuts, and tree nuts.

REMEMBER

Although most children lose their sensitivity to milk and eggs by age 3, food allergies involving peanuts, fish, shellfish, and tree nuts can last a lifetime.

Other, less obvious sources of food allergens may cause adverse reactions in a smaller number of susceptible individuals. These much less frequently problematic food allergens (listed in family groupings) include the following:

- **Goosefoot family:** Spinach, beets, Swiss chard, pigweed
- **Gourd family:** Watermelon, honeydew, cantaloupe, other melons, pumpkins, squash
- **Lily family:** Onions, leeks, garlic, asparagus
- **Mustard family:** Broccoli, cabbage, cauliflower, horseradish, turnips, radishes, mustard
- **Nightshade family:** Tomatoes, potatoes, eggplant, bell peppers, red peppers
- **Plum family:** Apricots, cherries, peaches, plums

ADDITIVES AND ALLERGIES

Allergic mechanisms may or may not play a part in some adverse food reactions commonly associated with food additives. When additives are in the picture, identifying a suspected food allergen can get complicated because finding out whether the food itself or the additive causes the problem is often difficult.

Sulfites are often used as antioxidants to preserve wine, dried fruit, shrimp, and potatoes. These additives have been implicated in cases of allergic food hypersensitivities, including potentially life-threatening *bronchospasm* (constriction of the airways) and asthma symptoms, especially in severe asthmatics who require long-term treatment with oral corticosteroids. (See Chapter 13 for information on long-term asthma therapy and these types of medications.)

The U.S. Food and Drug Administration prohibits the use of sulfites on fresh fruits and vegetables meant to be eaten raw (like from a salad bar) and requires manufacturers to label products that contain sulfites. However, precut or peeled potato products used in some restaurants to make common side dishes (such as french fries and hash browns) may still contain sulfites. Therefore, if you have asthma, always ask questions about the food served in restaurants.

You may need to speak with the people preparing your food, such as the chef, or perhaps with a restaurant manager who has precise information on various dishes' ingredients. Your food server may not have many of those details. If you're unable to determine whether sulfites are being used in certain dishes, you may want to avoid ordering those items altogether.

Doctors often need to be detectives to determine the causes of adverse food reactions. For example, if you experience an adverse food reaction to a hot dog, your doctor must determine whether your reaction is because of allergens in the meat, or whether you're suffering from hot dog headache due to nitrites used to preserve meat, or even whether you're reacting to an added food dye that creates the pink coloring.

How allergic food hypersensitivities develop

Atopy, the genetic predisposition toward having allergies, is a significant factor in the development of food allergies. An infant's immune system can begin responding to food allergens soon after birth.

As we explain in Chapter 1, your inherited tendency to develop allergies can express itself in other allergic conditions, such as *allergic rhinitis* (hay fever; see Chapter 7) and *atopic dermatitis* (eczema). The predisposition toward allergies passes between generations, but the specific allergies themselves may not.

Therefore, Mom may be allergic to lobster, Junior may break out in hives after eating peanuts, and Baby Betty may get congested after drinking cow's milk formula.

The severity of your symptoms may also depend on your sensitivity level to specific food allergens and the quantities of these foods you consume. In some cases, ingesting small amounts of food allergens may not trigger adverse reactions.

The best approach, of course, is to prevent the development of food allergy in the first place. The American Academy of Pediatrics (AAP) recommends parents introduce allergenic and nonallergenic foods, including peanuts, starting around four to six months of age in infants without a history of an allergic disorder such as eczema or food allergies. This recommendation is based on evidence supporting the approach that earlier rather than delayed introduction could potentially help prevent the development of food allergies.

GI tract allergies

Allergic reactions involving the digestive system can develop within a few minutes to several hours after ingesting food allergens, and they frequently result in abdominal pain, vomiting, and diarrhea. The most significant classifications of gastrointestinal (GI) tract allergies include

- **Gastrointestinal food hypersensitivity reaction:** This reaction generally occurs with other atopic conditions, such as allergic rhinitis and atopic dermatitis, and can cause nausea, stomach pain, vomiting, and, in some cases, diarrhea. In rare cases, a widespread systemic reaction such as anaphylaxis can also result (see "Anaphylaxis and allergic food reactions," later in this chapter).
- **Cow's milk allergy:** More than 2 percent of infants develop allergies to the proteins casein and whey (including lactalbumin and lactoglobulin) in cow's milk, resulting in adverse reactions (such as colic, vomiting, and diarrhea) even to very small amounts of these proteins. This reaction isn't the same as the more familiar syndrome known as *lactose intolerance,* which is a nonallergic, nonimmunologic response rather than an IgE-mediated reaction.
- **Eosinophilic esophagitis:** If you have this condition, a type of white blood cell called an *eosinophil* builds up in the lining of your *esophagus,* the tube that connects your mouth to your stomach. This reaction can be caused by foods, allergens, or acid reflux and can inflame or injure the lining of your esophagus. This can lead to difficulty swallowing or to food getting stuck when you swallow, which is known as *impaction.*

- **Allergic eosinophilic gastroenteropathy:** This rare condition can cause nausea and vomiting, abdominal pain, and diarrhea following meals. If not managed effectively, this type of allergy can result in *malabsorption* (poor absorption of food nutrients) and malnutrition, potentially leading to stunted or slowed growth in infants and weight loss in adults.
- **Oral allergy syndrome:** If you have allergic rhinitis, you may also experience oral allergy symptoms after consuming certain fresh fruits and raw vegetables. This *cross-reactivity* syndrome can occur if you're sensitive to ragweed pollen (with bananas and melons such as cantaloupe, honeydew, and watermelon), birch pollen (with apples, carrots, potatoes, hazelnuts, and members of the plum family), and mugwort pollen (with celery, apples, and kiwifruit). Your symptoms may include severe itching and swelling of the lips, tongue, and palate (roof of the mouth), as well as blistering of the throat and the mouth's mucus lining.

  Because these fruits and vegetables seem to trigger reactions only in their raw state, you may be able to consume them in cooked or frozen forms. However, make sure you check with your doctor before you cook up that vegetable stir-fry or cool off with a melon sorbet.

SEE YOUR DOCTOR

Hives and other food-related skin reactions

Allergic food hypersensitivities involving IgE antibodies can also trigger skin reactions in people whose atopic predisposition shows up through skin conditions. These conditions include

- **Atopic dermatitis (eczema):** Eggs, milk, peanuts, tree nuts, soybeans, and wheat can contribute to outbreaks in more than one-third of children affected by this skin condition.
- **Urticaria (hives):** These itchy welts can erupt from various types of reactions to many foods, including peanuts, tree nuts, milk, eggs, fish, shellfish, soybeans, and fruits, as well as food additives such as sodium benzoates, sulfites, and food dyes. Skin contact with raw meat, fish, vegetables, and fruit can also trigger hives. Allergic food hypersensitivities are more likely to act as triggers of *rapid-onset urticaria* (a particularly quick and severe eruption of hives) in children than in adults. Food-dependent exercise-induced anaphylaxis, which we discuss later in this chapter, can also trigger hives and angioedema.
- **Angioedema:** Also known as *deep swelling,* this condition results in deeper tissue inflammation and skin swelling, and is more likely to produce painful or burning sensations rather than itching. Angioedema can erupt as a reaction to the same food allergens that trigger hives.

WARNING

In severe cases of hives and angioedema, symptoms can also include swelling of the tongue, throat, and airway, difficulty swallowing, and fainting. If angioedema affects your face, the swelling may lead to breathing difficulties. If you experience swelling of your airway, get emergency care immediately.

Anaphylaxis and allergic food reactions

The most extreme of all allergic food symptoms is *anaphylaxis.* This abrupt, systemic allergic reaction, often caused by the same foods that trigger hives and angioedema, affects several organs simultaneously and can quickly turn life-threatening. In recent years, the incidence of this severe, and sometimes fatal, reaction has been rising at an alarming rate among asthmatics, with most of these episodes due to accidental ingestion of peanuts, tree nuts, or seafood.

What's particularly disturbing is the fact that so many of these known high-risk patients are aware of their diagnosis but still aren't carrying appropriate emergency medication, such as an epinephrine kit, when they experience their anaphylactic reaction, or don't receive immediate, potentially life-saving emergency care in time.

WARNING

As we explain in the "Preparing for emergency treatment for anaphylaxis" section, if you're an asthma patient or susceptible to food allergy–related anaphylactic reactions, keep emergency medication with you at all times. People with severe food allergies, especially children in school, should wear a medical alert bracelet or necklace.

GENERALIZED URTICARIA

REMEMBER

Generalized urticaria (widespread hives occurring simultaneously over much of your body) can often be the initial symptom of impending anaphylaxis and can result in a sudden swelling *(angioedema)* of the lips, eyelids, tongue, and windpipe (*laryngeal edema*), as well as wheezing and dizziness. This particularly dangerous reaction can quickly progress to anaphylaxis, leading to shock, *hypotension* (low blood pressure), *arrhythmia* (irregular heartbeat), and even *cardiorespiratory arrest* (sudden loss of breathing and heart function). In rare cases, this type of reaction can be fatal.

Common triggers of total body hives include allergic reactions to foods such as peanuts and shellfish (in people who have extreme hypersensitivities to these foods), severe allergic reactions to medications such as penicillin and related compounds, generalized hypersensitivity to latex, and extreme sensitivities to insect stings, including those of honeybees, yellow jackets, wasps, hornets, and fire ants.

FOOD-DEPENDENT EXERCISE-INDUCED ANAPHYLAXIS

Food-dependent exercise-induced anaphylaxis, a variant of exercise-induced anaphylaxis — which we explain in Chapter 1 — can occur when you exercise within three to four hours after eating a particular food. Two forms of this condition exist:

- You may develop anaphylaxis if you ingest particular foods, especially celery, shellfish, wheat, fruit, milk, or fish, prior to exercise. If you experience this reaction and you can identify the specific foods that trigger your episodes, your doctor may advise allergy skin testing (see Chapter 11) to confirm your sensitivity to the suspected foods.
- You may develop anaphylaxis while exercising, regardless of the type of food you've consumed.

AVOIDING PEANUT PROBLEMS IN CHILDREN

WARNING

As a parent of a peanut-allergic child, you need to pay close attention to products that may contain peanuts because they can cause life-threatening anaphylactic reactions in people who are extremely allergic to this food.

Keep these important points about peanuts and children in mind:

- Many foods contain peanuts as a not-so-obvious added ingredient. Therefore, examine all food labels for peanut ingredients and carefully select menu items when you're dining out with a child who is allergic to peanuts. (See "Avoiding Adverse Food Reactions," later in this chapter, for more information on foods that contain peanuts.) You may want to pack your child's lunch to reduce the risk of them unknowingly consuming foods with traces of peanuts in school lunches.
- Because so many foods include peanuts as an ingredient, instruct your young child not only to avoid peanuts but also never to accept foods — particularly snacks and candy bars — from others, especially playmates and young siblings.

AUTHOR SAYS

- Because the peanut allergy issue has received widespread media attention, many airlines now offer peanut-free flights. If your child suffers from food allergies of any kind, however, ask questions about the food on your flight, even if the airline claims that no peanuts or peanut ingredients are in the snacks or meals.

SEE YOUR DOCTOR

- A child who has a peanut hypersensitivity should wear a medical alert bracelet or necklace, especially at school. Also, ask your family doctor about supplying your child's school with an emergency epinephrine kit. Make sure school personnel know how and when to administer this medication.

PREPARING FOR EMERGENCY TREATMENT FOR ANAPHYLAXIS

TIP

If you're prone to anaphylaxis, carry injectable epinephrine with you at all times and receive emergency care as soon as possible after an attack occurs. Make sure you have an emergency plan in place that includes the following items:

- Keeping the medications your doctor has prescribed with you at all times in the event of an anaphylactic reaction no matter where you might be. If your medications are left in the medicine cabinet, they won't be available if you need them while away from home.
- A list of your symptoms.
- A written treatment plan prepared by your physician.
- Your physician's name and contact information.

If you're treated for anaphylaxis, don't be surprised if you continue to be observed in the emergency room for several hours after responding to initial rescue therapy. Unfortunately, in a few cases, patients who have responded well to initial anaphylaxis treatment have been immediately discharged from the emergency room but within a few hours have experienced a severe late-phase (or second) reaction, known as *biphasic anaphylaxis.*

SEE YOUR DOCTOR

Ask your doctor whether an emergency epinephrine kit, such as an EpiPen (or EpiPen Jr. for children under 66 pounds or AUVI-Q in three dosages, including one for infants and toddlers 16.5–33 pounds), with an injectable dose of epinephrine, is advisable for you or your child. Wear a medical alert bracelet or necklace in case you're unable to speak during a reaction.

MANAGING AND PREVENTING ANAPHYLAXIS

Food hypersensitivity is a leading cause of anaphylaxis. It's estimated that as many as 125 people in the United States die each year from food-induced anaphylactic reactions. As you may expect, the most effective long-term method for preventing food-induced anaphylactic reactions is to avoid eating foods that trigger the reaction. We provide more details on avoiding food allergens and establishing a safe diet in "Avoiding Adverse Food Reactions," later in this chapter.

REMEMBER

If your child suffers from food-induced anaphylaxis, notify babysitters, relatives, other children's parents, day care workers, teachers, and other school personnel of your child's sensitivities.

Nonallergic food hypersensitivities

TECHNICAL STUFF

You can also have food hypersensitivity from immune system reactions that don't involve the production of IgE antibodies. The most significant nonallergic food reactions include the following:

- **Food protein-induced enterocolitis syndrome (FPIES):** This condition primarily occurs in infants between 1 and 3 months of age. Characteristic symptoms include prolonged vomiting and diarrhea, often resulting in dehydration. Triggers are usually the proteins in formulas that contain cow's milk or soy substitutes. Occasionally, breastfed infants may also suffer from FPIES, presumably as the result of a protein ingested by the mother and transferred to the infant in maternal milk. Similar symptoms can occur in older children and adults in response to eggs, rice, wheat, and peanuts. However, most children outgrow this type of hypersensitivity by their third birthday.
- **Food-induced colitis:** Cow's milk and soy protein hypersensitivity have been implicated in this disorder, which can occur in the first few months of life and is usually diagnosed through the presence of blood, either seen by the naked eye or detectable through lab tests, in the stools of children who otherwise appear healthy. This condition often becomes less severe after 6 months to 2 years if children avoid the food allergens associated with it.

  TIP

  Feeding a hypoallergenic formula to your baby may help them overcome food-induced colitis.
- **Malabsorption syndrome:** This condition involves hypersensitivities to proteins in foods such as cow's milk, soy, wheat and other cereal grains, and eggs. Symptoms include diarrhea, vomiting, and weight loss or failure to gain weight.
- **Celiac disease:** This condition is a more serious form of malabsorption syndrome, and it can cause intestinal inflammation. Symptoms range from diarrhea and abdominal cramping to *anemia* (low red blood cell count) and *osteoporosis* (decreased bone mass). Celiac disease seems to occur only in people who inherit an atopic predisposition. Affected individuals develop a hypersensitivity to a component of gluten called *gliadin,* which is found in wheat, oats, rye, and barley. If you suffer from this syndrome, however, you're not necessarily doomed to a life without pasta and pancakes. Resourceful sufferers of celiac disease have come up with many gluten-free products, ranging from beer to pretzels.
- **Dermatitis herpetiformis:** This condition is a non-IgE-mediated food hypersensitivity to gluten that produces skin eruptions in addition to causing intestinal inflammation. Typical symptoms include a chronic itchy rash that appears primarily on the elbows, knees, and buttocks, although the disease can affect other areas as well.

- **Pulmonary hypersensitivity:** This rare condition, induced by cow's milk, primarily affects young children. Characteristic symptoms include a chronic cough, wheezing, and severe anemia. Removing the offending dairy products from the diet can substantially ease symptoms.

Understanding the Differences between Food Allergy and Food Intolerance

As we explain earlier in this chapter, many adverse food reactions don't involve an immune system response. These types of direct, nonimmunologic reactions are considered signs and symptoms of food intolerance and include the conditions we explain in the following sections.

Lactose intolerance

If you're lactose intolerant, odds are, your body doesn't produce sufficient amounts of the lactase enzyme to properly digest cow's milk. If you drink milk or consume foods with high milk content, you may experience stomach cramps, bloating, nausea, gas, and diarrhea.

TIP

Avoiding cow's milk and cow's milk products and adding the lactase enzyme to those foods are the standard ways of managing lactose intolerance. In contrast with the cow's milk allergy (which we mention earlier in "Allergic food hypersensitivities"), you may be able to consume small quantities of cow's milk without suffering an adverse reaction.

Metabolic food reactions

In some cases, eating average or normal amounts of specific foods (especially fatty foods) may disrupt your digestive system. These disruptions, called *metabolic food reactions*, may be caused by

- Medications (for example, antibiotics) you're taking for an illness
- A disease or condition (such as a GI virus) that may affect your digestive system
- Malnutrition (for example, due to a vitamin or enzyme deficiency)

SEE YOUR DOCTOR

Always remember to ask your doctor if any medication you're taking may disrupt your digestive system.

Pharmacologic food reactions

WARNING

More serious forms of metabolic food reactions can result if you combine certain foods and drugs that don't mix well. Beware of the following potentially dangerous combinations:

- All sources of grapefruit (including grapefruit juice) sometimes cause harmful interactions when taken with calcium channel blockers, such as Procardia, by inhibiting the enzymes that metabolize this medication. This interaction can result in an increase in the amount of unmetabolized medication in the blood stream.

  SEE YOUR DOCTOR

  If you have a heart condition, ask your doctor about possible interactions between any sources of grapefruit and any over-the-counter or prescription antihistamines you may take.
- If you take blood-thinning drugs such as Coumadin, check with your doctor before eating foods rich in vitamin K, like broccoli, spinach, and turnip greens, because they can reduce the medication's effectiveness.
- A harmful potassium buildup can occur if you overindulge on bananas while taking ACE inhibitors (hypertension medication), such as Capoten and Vasotec.

  SEE YOUR DOCTOR
- Avoid foods high in tyramine, such as cheese and sausage, if you take MAO inhibitors (anti-depressants), because the combination can cause a potentially fatal rise in blood pressure. Tyramine may also aggravate or trigger migraine headaches.
- The caffeine in coffee, tea, energy drinks, and colas can interact badly with ulcer medications such as Tagamet, and Pepcid AC. If your doctor prescribes theophylline for your asthma, reduce your caffeine intake, because caffeine can worsen side effects such as GI irritation, headache, jitteriness, and sleeplessness.

Food additive reactions

Doctors associate many types of food additives with adverse food reactions. The most frequently implicated food additives are

- **Monosodium glutamate (MSG):** When consumed in large quantities, this flavor enhancer reportedly causes burning sensations, facial pressure, chest

pain, headache, and, in rare cases, severe asthma symptoms. Although many sufferers associate these types of reactions with eating Chinese or other types of Asian foods, no conclusive studies have determined a clear link between consuming MSG and adverse food reactions. In any event, with the recent increase of MSG-free restaurants in many parts of the United States, you should have no trouble finding a place to chow down on chow mein without suffering ill effects.

- **Tartrazine (FD&C yellow No. 5 dye):** This and other food dyes can aggravate chronic hives and may be an ingredient in children's vitamins and cough syrups — another good reason to always check medication labels.
- **Sulfites:** Commonly found in processed foods and almost always in wine, sulfites can produce respiratory difficulties. For some individuals, sulfites can trigger potentially life-threatening airway constriction and asthma symptoms (see the sidebar "Additives and allergies," earlier in this chapter).

WARNING

Food poisoning

WARNING

Food poisoning can result from bacterial contamination of improperly prepared or handled foods, especially meats or salads. You've probably heard of bacterial bad guys such as *salmonella*, *E. coli*, *listeria*, and *staphylococcus* enterotoxin. These bacteria are the usual suspects in outbreaks of food poisoning. Food poisoning symptoms typically include nausea, vomiting, and diarrhea and can often mimic the flu. In rare cases, food poisoning reactions can be fatal if not treated in time.

Researchers believe that many cases of illness mistakenly diagnosed as the 24-hour flu bug are actually the result of ingesting tainted foods. A particular reaction from spoiled fish, known as *scombroidosis*, can mimic a food allergy due to the release of histamine-like chemicals. Itching, hives, and even shortness of breath can occur depending on the amount of spoiled fish a person has eaten.

REMEMBER

If many people develop similar symptoms after eating the same meal (the potato salad that sat in the sun all afternoon at the family picnic, for example), food poisoning is the likely cause of all those urgent trips to the restroom.

SEE YOUR DOCTOR

If you experience severe gastric distress that seems related to food poisoning, make sure you drink enough liquid to avoid dehydration, which is one of the most serious adverse effects. If your condition doesn't improve within 24 hours, seek medical attention.

Diagnosing Adverse Food Reactions

In order to diagnose your adverse food reactions, your physician should take a detailed medical history and conduct a physical examination. Your doctor may also ask you about the details of your reaction to figure out what may cause it.

Keeping a food diary

TIP

A detailed food diary, in which you record everything you consume (even those midnight snacks) and describe your reactions, can help your doctor diagnose your condition.

A well-kept food diary can assist you in sharing the following information with your doctor:

- The timing of your reactions. For example, do they occur immediately after you've consumed a food or liquid, and if not, how long afterward?
- The amount of food that seems to trigger a reaction.
- Where and how the food was prepared.
- The duration and severity of your symptoms.
- Any activities, especially exercise, associated with your reactions.

Considering atopic causes

As part of the physical examination, your doctor should look for signs of atopic diseases, including

- Dry, scaly skin, which can indicate eczema
- Dark circles under your eyes, which may indicate hay fever
- Wheezing and coughing, which can signal asthma symptoms

Eliminating possible food culprits

In some cases, your doctor may recommend an *elimination diet* as a way of confirming what triggers your adverse reactions. This process involves eliminating suspected foods from your diet, one at a time, under your doctor's supervision. If your symptoms significantly improve, your doctor may then gradually reintroduce the likeliest food suspect to determine whether it's the source of your woes.

Only undertake an elimination diet under your physician's direction. You don't want to deprive yourself of foods that may not cause your symptoms and are vital for your overall health. Your doctor may also advise an elimination diet in order to prepare you for an oral food challenge, which we describe in the following section.

Testing for food allergens

If your doctor can't readily identify the cause of your reactions, they may recommend confirming a suspected food allergen with the allergy tests we describe in the following sections.

Skin testing

Skin testing involves using specific food extracts to evaluate your sensitivity to suspected allergens. Only a qualified specialist, such as an allergist, should perform skin testing.

Skin testing for food allergens isn't always recommended. In some cases, your doctor may not advise skin testing because a positive reaction may involve unacceptable risks of inducing anaphylactic shock, particularly if you're highly sensitized to certain foods, such as peanuts.

In general, prick-puncture tests are the only skin tests your doctor needs to administer when attempting to identify suspected food allergens. (See Chapter 11 for more about prick-puncture tests.)

Oral food challenges

Oral food challenges involve ingesting — under medical supervision — small quantities of foods that contain suspected allergens.

To ensure the most accurate diagnosis, your doctor should administer an oral food challenge while you're symptom-free, usually as a result of a food elimination diet. Depending on the severity of your adverse food reactions and the type of food allergen they suspect as the cause, your doctor may choose to administer one or more of the following oral food challenges:

- **Open food challenge:** In this type of test, your doctor informs you what type of food you're ingesting.
- **Single-blind food challenge:** With this test, your doctor doesn't inform you what you're eating. However, your doctor or the clinician administering the test knows the ingredients.

- **Double-blind, placebo-controlled oral food challenge (DBPCOFC):** This elaborate procedure is the gold standard for identifying food allergens. Neither you nor your doctor (nor the clinician who administers the test) knows the contents of the test. A third party, such as a nurse or a lab technician, prepares the opaque capsule for testing. In most cases, your doctor schedules a DBPCOFC so you can fast for a prescribed amount of time beforehand. You also need to stop taking antihistamines (based on your doctor's advice) prior to the challenge, because these drugs can interfere with the test's accuracy. The initial dose of the suspected food in this test is usually half the minimum quantity your doctor estimates as the trigger for your reaction. After the test, the technician identifies the capsule's contents to help your doctor make the proper diagnosis.

WARNING

Take this challenge only in a facility equipped to treat potentially severe reactions. If your history of adverse food reactions is life-threatening, your doctor will most likely advise you that an oral food challenge is too risky.

Enzyme-Linked Immunosorbent Assay (ELISA) testing

Your doctor may recommend ELISA testing, the most common and preferred technique in detecting food allergens. ELISA allows for the detection of the allergen protein molecule by binding antibodies to the allergen. This might be a preferred approach to food allergy testing if skin testing or oral food challenges seem too risky. Similar to skin prick-puncture testing, blood testing can detect the presence of allergen-specific IgE antibodies in your blood, but a positive result doesn't in itself confirm a diagnosis of food allergy.

Avoiding Adverse Food Reactions

WARNING

After your doctor determines the source of your adverse food reactions, the most effective long-term approach to managing your condition and preventing further reactions is strict avoidance of the implicated food. That may seem like an obvious solution; however, you may need to become an expert at reading ingredient listings on packages when you buy groceries. In some cases, food allergens and other types of precipitants may hide under obscure names on food labels. Hidden ingredients in many processed and packaged foods may also be sources of problematic allergens.

For updates and information on food allergens and related issues and to find out how to decipher ingredients listed on food labels, contact Food Allergy Research and Education (FARE) at 800-929-4040 or visit FARE's website at https://foodallergy.org/.

Make sure your family, friends, and colleagues all understand what causes your adverse food reactions. You can then minimize the chances of erupting in hives at the Thanksgiving feast or during that crucial dinner with your boss and the company's new clients.

TIP

If you have a life-threatening food allergy, you may need to avoid certain restaurants. In many cases, food servers don't have enough information about the ingredients in the establishment's menu items to guarantee you an allergen-free meal, although some restaurants do offer dishes without common food allergens. Always double-check all the ingredients in the menu item with the chef or restaurant manager. Also, inquire whether the restaurant prepares allergen-free meals using surfaces, cookware, fryers, and utensils that are kept separate from everything else in the kitchen.

SEE YOUR DOCTOR

If effective management of your adverse food reactions involves excluding common food groups from your diet for long periods, consider getting professional dietary advice to prevent nutritional deficiency or malnutrition.

Investigating Recent Developments in Treating Food Allergy

For most food allergens, preventing a reaction is mainly done by avoiding the implicated food. The following therapies are intended to help prevent or at least lessen adverse reactions in patients who may nonetheless ingest allergens that trigger their hypersensitivities:

- **Oral immunotherapy (OIT):** In 2020, the U.S. Food and Drug Administration (FDA) approved the first treatment for peanut allergy. Palforzia is a form of OIT taken every day with small, increasing amounts of purified peanut protein powder. Approved for children ages 4–17, it decreases the risk of a severe allergic reaction after just a small bite of peanut. However, it isn't a cure, and peanuts still need to be avoided.
- **Sublingual immunotherapy (SLIT):** In this type of therapy, a food allergen is dissolved in a small amount of liquid and held under the tongue (*sublingually*) for several minutes before being spat out or swallowed. The undigested

allergen is introduced to the cells in the lining of the mouth, promoting tolerance to the food being treated. SLIT is undergoing further research and is not yet FDA approved for treatment of food allergy.

- **Epicutaneous immunotherapy (EPIT)**: This new class of immunotherapy, which is delivered through a Viaskin patch, is designed to induce an immune response by introducing minimal amounts of peanut allergen to the skin. The patch is placed onto the skin daily to make the patient less sensitive to peanuts. The Viaskin EPIT patch is under FDA review but hasn't been approved as of this writing.
- **Oral mucosal immunotherapy (OMIT):** With this new delivery platform, treatment of food allergies is based on embedding the allergen (for example, peanut) into a fully functional toothpaste that can be conveniently administered as a daily treatment while patients brush their teeth. Clinical trials of OMIT are now being conducted to achieve FDA approval.
- **Biologics:** These medications represent a new approach for the development of treatments that inhibit specific mechanisms of food allergy. Presently, biologics, and in particular anti-IgE, are being investigated for the possible treatment of food allergies. Several studies have shown positive results with Xolair (omalizumab) as single therapy and as an adjunct to oral immunotherapy in patients with single and multiple food allergies.

In addition to the preceding therapies, others are being investigated, providing real hope for effective treatments of food allergies.

IN THIS CHAPTER

- Knowing how exercise can trigger asthma symptoms
- Maintaining fitness with asthma
- Making the connection between asthma and athletes
- Understanding how strong emotions can spark asthma symptoms

Chapter 9
The Roles of Exercise and Emotions

You don't have to sit on life's sidelines just because you have asthma, even though most asthmatics are susceptible, in varying degrees, to symptoms of *exercise-induced asthma* (EIA), also known as *exercise-induced bronchospasm* (EIB). As we explain in this chapter, you can effectively manage EIA by properly using any medications your doctor prescribes and by integrating a suitable warm-up and cool-down routine into your exercise regimen.

Intense crying, excitement, fear, anger, and even laughing can also affect your asthma. Although asthma is not a nervous disorder, these types of strong emotions nonetheless can change breathing patterns, leading to an increased respiratory rate and other asthma symptoms. We cover the role emotions play in asthma in the "Dealing with the Effects of Emotions on Asthma Symptoms" section at the end of the chapter.

Understanding EIA

Typically, EIA symptoms start minutes after you begin vigorous activity, when the airways in your lungs become narrow and constricted. These respiratory symptoms usually reach their peak of severity between 5 and 10 minutes after you stop exercising. In many cases, the symptoms can spontaneously resolve (without the use of a short-acting inhaled bronchodilator) within 30 minutes.

Exercise that involves breathing cold, dry air, such as running outdoors or skiing, is more likely to trigger EIA than activities that involve breathing warmer, humidified air, such as swimming in a heated pool. This is because cooling of the airways and evaporation of moisture from the bronchial tubes cause cells in their lining to release histamine and other chemicals that make the muscles of the airways contract. However, a few studies have cautioned that chlorine and other chemicals used in swimming pools are direct irritants that can act as EIA triggers in some asthmatics.

Although EIA usually relates to outside activities, using home-exercise equipment or simply running up the stairs can provoke an asthma episode in some people. If you have an increased sensitivity for EIA, make sure your doctor knows so they can evaluate and treat your condition.

Keeping Fit Despite EIA

Because EIA is not inflammatory and therefore not associated with increasing airway hyperresponsiveness — also known as bronchial hyperresponsiveness (BHR) or bronchial hyperactivity — (see Chapter 1), there's no reason people with asthma should avoid exercise. Still, EIA symptoms occur frequently in asthmatics when they exert themselves vigorously, and for certain individuals, physical activity may be the only trigger that leads to respiratory symptoms such as coughing, wheezing, and shortness of breath. Occasionally, patients mistakenly attribute their EIA symptoms to just "being out of shape," rather than seeking a proper medical diagnosis.

If you're experiencing respiratory symptoms connected to exercise and other types of intensive physical activities, make sure you get a proper diagnosis. Although EIA episodes usually last for only a few minutes, they can still be frightening and, as a result, may unnecessarily limit your physical activities.

Diagnosing EIA can improve asthma treatment

Properly diagnosing and treating EIA usually means that you can enjoy an active lifestyle. Doctors can often prescribe medications to prevent — or at least substantially reduce — your EIA symptoms, thus allowing you to participate in many types of exercise and sports despite your asthma.

REMEMBER

Receiving appropriate treatment for EIA is essential for your well-being because so many people in the United States and other developed countries simply don't get enough exercise. According to a report by the Centers for Disease Control and Prevention, adults with asthma in the United States are even less likely on average than adults without asthma to meet national recommendations for physical activity.

We're not suggesting you run a marathon tomorrow, but as we emphasize in many other parts of this book, staying in good physical shape can only help you manage your asthma (or any other ailment) successfully. So don't let your susceptibility to EIA keep you from getting the exercise you need. Rather, consult with your doctor to find effective ways of managing your condition that can also allow you to stay in shape.

SEE YOUR DOCTOR

Keeping a record of your activities and noting when you experience asthma symptoms and what steps you normally take to relieve them can help your doctor develop the most effective treatment program for you. Because certain drugs are more effective in preventing and controlling EIA, *when* you take your prescribed medication is often just as important as *what* you take. Work with your doctor to determine the best time to take your prescribed medication to ensure it provides maximum relief.

Controlling EIA with medications

In many cases, competitive athletes with asthma or EIA use inhaled corticosteroids daily to control their airway inflammation. Many competitive athletes add a long-acting inhaled beta$_2$-adrenergic bronchodilator daily, such as salmeterol (Serevent, Serevent Diskus) or formoterol (Foradil), and/or a short-acting inhaled beta$_2$-adrenergic bronchodilator, such as albuterol (Proventil, Ventolin), prior to exercise or athletic events (see Chapter 13).

To prevent EIA, your doctor may recommend that you inhale your dose of prescribed short-acting beta$_2$-adrenergic bronchodilator 15 to 30 minutes before you begin to exert yourself. The long-acting bronchodilator salmeterol — available in dry-powder inhaler (DPI) formulation as Serevent Diskus or in a metered-dose inhaler (MDI) as Serevent MDI — may be prescribed for use 30 minutes before exercising. Doctors usually prescribe these medications as part of combination therapy with inhaled corticosteroids. (See Chapter 12 for the differences between DPIs and MDIs.)

In the past, other long-term MDI controller drugs that doctors prescribed to treat EIA symptoms included cromolyn (Intal) and nedocromil (Tilade) — both inhaled mast cell stabilizers. Unfortunately, these products are no longer on the market. Studies have shown that, when taken regularly, montelukast (Singulair), an oral leukotriene inhibitor (see Chapter 13), may be an effective long-term preventive treatment for EIA.

Athletes and EIA

According to recent studies of respiratory conditions, Olympic-level competitors as a group are most likely to experience EIA episodes. Research indicates that labored breathing by these competitors during sports events and intensive workouts may be an important factor in triggering their respiratory symptoms.

Breathing competitively: Nose versus mouth

Another reason athletes are at increased risk for EIA is that all people — not just Olympic champions — switch from nose breathing to mouth breathing when they're strenuously exerting themselves. As we explain more extensively in Chapter 1, one of your nose's most important functions is to protect your airways from particles in the air. Your nose filters and cleanses the air you inhale with *cilia* (tiny hairlike projections) that sweep mucus through your nasal passages.

However, filtering isn't in your mouth's job description. Therefore, when you're seriously exerting yourself and gulping in air through your mouth, you're also increasing your chances of inhaling allergens and irritants that can more easily get into the airways of your lungs and potentially trigger serious reactions.

Because your body needs all the oxygen it can get when you're vigorously working out or competing, breathing through your mouth can be a reflex, which is all the

more reason to make sure you're taking medications to prevent or at least reduce the severity of EIA symptoms.

Contrary to popular myth, sports federations such as the NCAA or the U.S. Olympic Committee haven't banned the use of inhaled corticosteroids that athletes take on a regular basis to control asthma symptoms. (The steroids that various sports committees ban are male hormones that some athletes take by tablet or injection to build muscle mass.) However, some common over-the-counter (OTC) medications, such as pseudoephedrine (Sudafed), are banned due to their stimulant effects. Check with your sports federation before taking any medication, including OTC products.

Warming up and cooling down to prevent EIA

Many doctors recommend some type of warm-up and cool-down routine (even if you don't have asthma) when you're engaging in exercise or sports-related activity. Consult with your physician to determine the type of pre- and post-exercise routine that's most beneficial for you. After you've devised a warm-up and cool-down plan, incorporate that routine into your asthma management plan (see Chapter 5).

If you stick to your asthma management plan, asthma shouldn't prevent you from enjoying or even excelling at a wide range of physical activities. Consider the examples of Jackie Joyner-Kersee and other Olympic champions who also suffer from asthma. (See Chapter 1 for more famous folks with asthma — the list may surprise you!)

Dealing with the Effects of Emotions on Asthma Symptoms

Strong emotions — such as anger, fear, stress, and excitement — can trigger your asthma. Even emotional responses, like laughing and crying, can lead to breathing difficulties because your body's response to different emotions can change the way you breathe. For example, when you're feeling emotional, you may respond by experiencing rapid and deep breathing. This is called *hyperventilating*, and it can make your airways narrow, causing asthma symptoms such as coughing, wheezing, breathlessness, or chest tightness.

Stressing out

Stress can trigger respiratory symptoms in people with a history of asthma. Stress may also contribute to the development of asthma. A recent study proposed a possible link between long-term stress and the initial onset of asthma symptoms, particularly if the onset occurs during childhood or adolescence in someone who has multiple sources of stress.

Stress is a mental and physical response to adversity. It happens when someone feels a sense of pressure or threat, or when they feel they cannot cope with the issues confronting them. Research suggests that stress may contribute to asthma symptoms in ways described in the following sections.

Faster breathing

Your body interprets stress as a sign of danger, which activates the *sympathetic nervous system* (the part of the nervous system that responds to emergencies). When this occurs, your body prepares to fight or flee, as though you are in physical danger. This can cause faster breathing, increased muscle tension, and rapid heartbeat.

This fight-or-flight response may help people survive dangerous situations, but it can also make you feel as though it's difficult to breathe and can trigger asthma symptoms. Fortunately, the reverse process can occur if stress is handled properly. Relaxation and breathing exercises can help you manage stress and activate the *parasympathetic nervous system* (the part of the nervous system that calms the body), which may improve asthma symptoms, according to the American College of Asthma, Allergy & Immunology.

Inflammation

Another way stress may contribute to asthma is through an inflammatory process. It has been established that stress is among several asthma triggers that elevate inflammation (see Chapter 6 for a full discussion of asthma triggers). Other triggers may include

- Exposure to tobacco smoke
- Living close to traffic noise
- Indoor and outdoor allergens

Previous research also reports that stress can increase cytokine and eosinophil levels. *Cytokines* are chemicals involved in airway inflammation, and *eosinophils* are white blood cells, which are associated with inflammation. Elevated levels of cytokines and eosinophils may increase the symptoms and severity of asthma.

It has been observed that stress can even reduce a person's response to certain types of asthma medications. These include inhaled beta$_2$-agonists, such as albuterol, and inhaled corticosteroids, such as fluticasone (see Chapter 13).

Improving asthma control by managing emotions

Because everybody's triggers for asthma are different, it's possible that your emotions may not affect your asthma. However, if you suspect that emotions are one of your asthma triggers, it's a good idea to track the timing and causation of your asthma symptoms.

Here are five basic ways to help manage your emotions and asthma symptoms:

- **Do your best to get emotional support.** Of course, everybody feels emotional from time to time. However, if you feel overwhelmed or down, talk to somebody you trust about your concerns.
- **Make sure you have a written asthma action/management plan from your doctor.** When you develop a plan with your doctor, you know exactly what to do if you have increased respiratory symptoms (see Chapter 5 for more information on developing an asthma action plan).
- **Always manage your asthma as well as possible.** This means taking your preventer medicines as prescribed, even if you feel well (see Chapter 13).
- **Always keep your reliever inhaler with you.** This is especially important in situations where you know you may feel emotional (see Chapter 14 for details on treating asthma episodes).
- **Practice your breathing exercises.** These exercises may ease your asthma symptoms and help you feel more relaxed.

Remember to share with your doctor anything that makes your asthma symptoms worse, even if it's your emotions. It's important to fully understand and manage all asthma triggers to achieve the greatest benefit possible.

IN THIS CHAPTER

- Treating your nasal symptoms more effectively
- Managing your nasal and eye symptoms
- Easing itchy, red eyes
- Knowing the complications of untreated or poorly managed allergies
- Diagnosing sinus and ear infections

Chapter 10
The Role of Other Medical Conditions

Many people with asthma also have *allergic rhinitis* (hay fever). The multiple allergens that commonly trigger the allergic reactions that induce symptoms of allergic rhinitis often aggravate or worsen the respiratory symptoms associated with asthma. (Remember, your airways, from your nasal passages down to the smallest bronchioles in your lungs, form a continuum, or interconnected system.) Extensive studies over the last 30 years have shown that patients with allergic asthma usually are more successful in managing their respiratory condition if they take effective measures to control their allergic rhinitis symptoms.

Ineffective treatment can lead to serious complications of allergic rhinitis, such as *sinusitis* (an inflammation of the sinuses) and *otitis media* (an inflammation of the middle ear). Other conditions, such as *tonsillitis* (an inflammation of the tonsils), adenoid disease, and chronic cough, can be worsened by *postnasal drip* (nasal discharge that trickles down the back of your throat). This characteristic symptom of allergic rhinitis, which usually increases in severity when the ailment is poorly managed, can result in the spread of bacteria-laden mucus that irritates or infects the throat's lining.

You can significantly improve your quality of life by taking avoidance measures and allergy-proofing your home and office, decreasing your exposure to the substances that trigger your allergic reactions and, in most cases, your asthma episodes. (See Chapter 7 for more on allergy-proofing and avoidance measures.) However, because allergens such as pollens, molds, and dust are everywhere, complete avoidance can be difficult, if not impossible. Fortunately, many types of allergy medications are available. If used properly — based on your physician's advice — medications can prevent or relieve your allergic reactions.

In this chapter, we explain how the most common nasal allergy medications work, the potential side effects they have, and how you can make smart choices to control your allergic reactions. Effectively treating those reactions is often the most important factor in reducing — and, in some cases, even eliminating — many common respiratory symptoms, thus improving your asthma and your overall quality of life. We also discuss why effective treatment of allergic rhinitis can be vital in avoiding complications of ear, nose, and throat symptoms.

Getting Familiar with Pharmacology

The many drugs available for treating nasal allergies have various uses and characteristics. Some allergy medications are designed for one specific purpose, whereas others have more flexible uses. In general, nasal allergy medications fall into three categories of usage:

- **Preventive:** If used properly, these types of medications can keep your nasal symptoms from developing. For people who have chronic symptoms of rhinitis, allergic or nonallergic (see Chapter 7), the most effective approach is to preventively use antihistamines (oral or nasal) and nasal corticosteroid medications (see the "Using Nasal Corticosteroids" section, later in this chapter).
- **Stabilizing:** These drugs can often stop a reaction that's already in process before your immune system can release potent chemical mediators of inflammation, such as histamine and leukotrienes (see Chapter 13), that produce noticeable symptoms.
- **Relief:** Most of the commonly available over-the-counter (OTC) oral antihistamines and decongestants fall into this category. Many people use them to relieve the symptoms of rhinitis after symptoms have occurred. As we explain in this chapter, you're usually not taking full advantage of antihistamines and nasal corticosteroid sprays if you only use them after your symptoms have started.

Whether prescribed or purchased OTC, a few basic types of drugs are used to treat nasal allergies, including the following:

- Antihistamines (available OTC and by prescription in various forms)
- Antihistamine nasal sprays (available OTC and by prescription)
- Decongestants (available OTC and by prescription in oral form, or as nonprescription nasal sprays and drops)
- Combinations of antihistamine (available OTC and by prescription in oral form) and decongestant products are also used for multisymptomatic relief, as we discuss in the later section "Two for the Nose: Combination Products"
- Nasal corticosteroid sprays (available OTC and by prescription)
- Mast cell stabilizer nasal sprays containing cromolyn (available OTC)
- *Anticholinergic* (drying) nasal sprays (available only by prescription)

To get the most out of your treatment, take the time to understand what each medication can do to relieve your symptoms. We explain the uses and benefits of each product in this chapter.

TIP

An informed patient is a healthier patient. If your doctor prescribes medication for your allergic rhinitis (or any ailment), don't hesitate to inquire about the product, why it's being prescribed, and any possible side effects. For further information on what you should know, see Chapter 19.

Blocking Your Histamines: Antihistamines

As the name indicates, *antihistamines* are medications (available in tablet, capsule, liquid, or nasal spray form, or by injection) that counter the effects of *histamine* — a chemical substance released by the body as the result of injury or in response to an allergen. *First-generation* (sedating) OTC antihistamines have been in use since 1942 and are frequently the first medication option for allergic rhinitis sufferers. We discuss the important differences between OTC antihistamines and most of the newer *second-generation* (nonsedating or less sedating) antihistamines in the section "Newer antihistamines," later in this chapter.

Both first- and second-generation antihistamines block the effects of histamine and are most effective in controlling or alleviating symptoms such as sneezing, runny nose, and itchy nose, eyes, and throat. However, these medications may not reduce nasal congestion. As a result, they're frequently combined with a decongestant to relieve symptoms of congestion. In addition, antihistamines produce

various side effects, depending on the type of product (OTC or prescription), dosage levels, and course of medication.

MYTH BUSTER

As an asthma patient, don't be afraid to use antihistamines, depending on your specific condition and your doctor's advice. In the past, product information labels advised asthma patients not to use antihistamines because these medications theoretically dry out the airways. However, studies show that the nasal symptom relief produced by antihistamines improves the lung functions of many people with asthma.

Histamine hints

TECHNICAL STUFF

Mast cells (among the cells that line your nose and respiratory tract) produce and release a chemical substance called *histamine*. You may only become aware of histamine when your immune system releases massive amounts of this chemical into your nasal tissue as a reaction to injury or in the presence of an allergen. After being released from the mast cells, histamine seeks out "receptor" sites located in the nasal lining tissues.

A dose of prevention

Many people tend to use antihistamines only as rescue medication. However, these products usually work much better and give greater relief when they're taken preventively. Taking an antihistamine to relieve your symptoms is like closing the barn door after your horse has already bolted. You're not going to get that horse back in the barn (although by closing the door, you at least prevent any others from escaping).

TIP

Antihistamines usually work best when taken on a regular basis before allergen exposure occurs. For example:

- If you're allergic to ragweed pollen, start using your medication at the beginning of August — before ragweed pollens are released in the middle of the month — and continue using the medication until after ragweed season is over. Even if you're exposed to significant amounts of allergen, you usually experience far fewer symptoms by using this type of preventive approach.
- If you know that animal dander triggers your allergic rhinitis and you plan to visit someone who has pets, take your antihistamine two to five hours beforehand. Also, remember to continue with the antihistamine after you leave, until you have an opportunity to change your clothing, because dander is probably on your clothes.

First-generation OTC antihistamines

The most common variety of antihistamine medications is first-generation nonprescription products that are available in OTC form. Hundreds of these nonprescription antihistamine products line drugstore and supermarket shelves. Most of these products, however, are just different brand names for a few of the same active ingredients, such as

- **Brompheniramine maleate:** The active ingredient in Dimetapp
- **Chlorpheniramine maleate:** The active ingredient in Chlor-Trimeton
- **Clemastine fumarate:** The active ingredient in Dayhist
- **Diphenhydramine hydrochloride:** The active ingredient in Benadryl

WARNING

Although first-generation OTC antihistamines can relieve allergic rhinitis symptoms such as sneezing, runny nose, and itchy nose, eyes, and throat, they also produce side effects that can significantly interfere with your daily life. These OTC antihistamines can cross from the bloodstream into your brain, where they affect histamine receptors in the central nervous system, resulting in drowsiness — the most serious and potentially dangerous side effect.

WARNING

Consider these factors when taking nonprescription antihistamines:

- Many states in the United States consider people who take first-generation OTC antihistamines to be under the influence of drugs. The Federal Aviation Administration prohibits pilots from flying if they take OTC antihistamines within 24 hours of flight time. Similar restrictions on the use of first-generation OTC antihistamines apply to truck and bus drivers and operators in other transportation industries.
- Operating heavy machinery or engaging in activities that require alertness, coordination, dexterity, or quick reflexes while taking first-generation OTC antihistamines is dangerous.
- Avoid alcohol, sedatives, antidepressants, or other types of tranquilizers while taking first-generation OTC antihistamines.
- First-generation OTC antihistamines can produce other side effects, including the following:
  - Dizziness
  - Dryness of mouth and sinus passages
  - Gastrointestinal irritation or distress

- Nasal stuffiness
- Urine retention (which can aggravate existing prostate problems)

» Recent studies show that children with allergic rhinitis who take diphenhydramine (the active ingredient in Benadryl) for their symptoms score significantly lower on learning ability tests than children who receive equivalent doses of loratadine (the second-generation OTC antihistamine Claritin).

AUTHOR SAYS

Many asthma patients don't tolerate the side effects of first-generation nonprescription antihistamines. As a result, they're less likely to take a long-term or even mid-term preventive course of a first-generation nonprescription antihistamine medication. Instead, asthma patients may resort to these older OTC antihistamines as quick short-term fixes after allergens trigger their allergic rhinitis symptoms. This approach often leads to a pattern of debilitating recurring symptoms that can increase the chances that their respiratory ailments will worsen and thus diminish their quality of life.

Newer antihistamines

MYTH BUSTER

Due to significant advances in research since the development of first-generation antihistamines more than 60 years ago, several of the newer second-generation antihistamines have fewer side effects. Some of the benefits of these second-generation medications include

» They don't cross the blood-brain barrier, which means that second-generation products such as fexofenadine (Allegra), loratadine (Alavert and Claritin) and desloratadine (Clarinex) are nonsedating or, in the case of cetirizine (Zyrtec) and levocetirizine (Xyzal), cause only mild sedative effects.

» Side effects other than drowsiness, such as dry mouth, constipation, urine retention, or blurred vision, occur less frequently or are much less noticeable with second-generation antihistamines.

» Although second-generation antihistamines, whether prescription or OTC (such as loratadine — the active ingredient in Alavert and Claritin), can cost more than most first-generation nonprescription antihistamine products, the more recently developed products work longer and require only one or two doses per day to prevent or relieve allergic rhinitis symptoms.

» For the most part, second-generation products work as rapidly as the first-generation drugs. For example, desloratadine (Clarinex), loratadine (Claritin), cetirizine (Zyrtec), and levocetirizine (Xyzal) usually start functioning within 30 minutes.

» Overall, patients who use second-generation antihistamines usually experience much less disruption or impairment in their daily lives.

Because of these factors, second-generation antihistamines (see Table 10-1) can greatly improve the treatment of allergic rhinitis. Asthma patients are far more likely to stick with second-generation antihistamines for the prescribed course, which often results in more effective prevention of allergic rhinitis symptoms and significant improvement of their respiratory symptoms and overall condition.

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

TABLE 10-1 **Second-Generation Prescription (and OTC) Antihistamines**

Active Ingredient	Formulation	Brand Name	Total Usual Daily Dose for Children under 12 Years (See Formulation Details)	Total Usual Daily Adult Dose
Cetirizine	5 mg, 10 mg tablet (ages 12 years and older); 5 mg/5 ml syrup (2–5 years)	Zyrtec	Tablet, 1 tablet once per day; syrup, 2–5 years of age: ½ teaspoon (2.5 ml) daily; 6–11 years of age: 1–2 teaspoons (5–10 ml) daily	1 tablet once per day
Cetirizine (with 120 mg pseudoephedrine)	5 mg tablet (12 years and older)	Zyrtec-D	Not approved for children under 12 years of age	1 tablet twice per day
Desloratadine	5 mg tablet (12 years and older)	Clarinex	Not approved for children under 12 years of age	1 tablet once per day
Fexofenadine	30 mg/5 ml syrup; 30 mg tablet (6–11 years)	Children's Allegra	Syrup, 1 tsp (5 ml) every 12 hours (for ages 2–12 years); 1 tablet twice per day	2 tsp (10 ml) every 12 hours 2 tablets twice per day
Fexofenadine	60 mg capsule, 60 mg tablet (12 years and older)	Allegra	Not approved for children under 12 years of age	1 capsule twice per day 1 tablet twice per day
Fexofenadine	180 mg tablet (12 years and older)	Allegra-24 Hour	Not approved for children under 12 years of age	1 tablet once per day
Fexofenadine (with 120 mg pseudoephedrine)	60 mg tablet (12 years and older)	Allegra-D	Not approved for children under 12 years of age	1 tablet twice per day

(continued)

TABLE 10-1 *(continued)*

Active Ingredient	Formulation	Brand Name	Total Usual Daily Dose for Children under 12 Years (See Formulation Details)	Total Usual Daily Adult Dose
Levocetirizine	5 mg tablet (12 years and older) Oral solution 2.5 mg/5ml	Xyzal	Oral solution (2–11 years of age) 2–5 years of age: ½ tsp (2.5 ml) at night; 6–11 years of age: 1 tsp (5 ml) at night	1 tablet at bedtime or 1–2 tsp (5–10 ml) at bedtime
Loratadine	10 mg tablet (6 years and older)	Claritin	1 tablet once per day (6 years and older)	1 tablet once per day
Loratadine	10 mg tablet (rapidly disintegrating) (6 years and older)	Claritin RediTabs	1 tablet once per day (6 years and older)	1 tablet once per day
Loratadine	10 mg tablet (rapidly disintegrating) (6 years and older)	Alavert	1 tablet once per day (6 years and older)	1 tablet once per day
Loratadine	5 mg/5 ml syrup	Children's Claritin Syrup	2–6 years of age: 1 tsp (5 ml) daily; over 6 years of age: 2 tsp (10 ml) daily	2 tsp (10 ml) daily
Loratadine (with 120 mg pseudoephedrine)	5 mg tablet (12 years and older)	Claritin-D 12 Hour	Not approved for children under 12 years of age	1 tablet twice per day
Loratadine (with 240 mg pseudoephedrine)	10 mg tablet (12 years and older)	Claritin-D 24 Hour	Not approved for children under 12 years of age	1 tablet once per day

mg = milligram
ml = milliliter

Antihistamine nasal sprays

The names, formulations, and doses in the following list are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

On the front lines of allergic rhinitis treatment, additions to the antihistamine arsenal in the United States are *azelastine hydrochloride* and *olopatadine hydrochloride.* Remember these basic facts about these nasal sprays:

- Azelastine and olopatadine hydrochloride are highly effective for the treatment of seasonal allergic rhinitis symptoms such as sneezing, runny nose, and itchy nose, eyes, and throat.

- Studies show that, in contrast to most oral antihistamines, azelastine and olopatadine often help reduce nasal congestion (stuffy nose), which may make them particularly useful in dealing with the congestion that often accompanies allergic rhinitis due to late-phase reactions (delayed reaction, see Chapter 6).
- You can use azelastine and olopatadine nasal sprays in combination treatment with nasal corticosteroid sprays in cases that require more prevention or relief. (See "Using Nasal Corticosteroids," later in this chapter, for more information on these sprays.)
- The U.S. Food and Drug Administration (FDA) approved azelastine for the treatment of *vasomotor rhinitis* (nonallergic rhinitis; see the "Skier's nose" sidebar later in this chapter) for patients who are 12 or older. The recommended dosage for azelastine and olopatadine is 2 sprays in each nostril twice a day for patients older than 12 and 1 spray in each nostril twice a day for children ages 6 to 11.
- These sprays usually start to take effect within 3 hours.
- In cases of prolonged use of azelastine and olopatadine, side effects may include a bitter taste and drowsiness in cases of prolonged use.
- Patanase (olopatadine) is a prescription intranasal antihistamine supplied in a white plastic bottle with a metered-dose manual spray pump. Patanase may cause sleepiness or drowsiness.
- Astepro (azelastine) was recently approved by the FDA to be used without a prescription in patients who are 6 or older. For adults and children older than 12, the dose is 1 to 2 sprays in each nostril once or twice daily. For children ages 6 to 11, dosing is one 1 spray in each nostril every 12 hours.

Decongesting Your Nose

People commonly use *decongestants* to relieve their stuffy noses. You can find two types of decongestants: oral decongestants in tablet, capsule, or liquid form, and nasal decongestants in the form of nasal sprays or nose drops. Unlike antihistamines, no second-generation decongestants have yet been developed.

Oral decongestants

Nonprescription oral decongestants are among the most widely used OTC products in the world, and you can find them in various tablet, capsule, or liquid forms.

These medications work by shrinking blood vessels, thus reducing the amount of fluid that leaks into tissues lining the nose and decreasing nasal congestion. The most commonly used decongestants are *pseudoephedrine* and *phenylephrine*.

Pseudoephedrine is the active ingredient in OTC oral decongestants such as Sudafed, and in antihistamine-decongestant combinations such as Actifed and Dimetapp. This drug is the "D" (standing for decongestant) in the commonly used second-generation antihistamine products known as Allegra-D, Claritin-D, and Zyrtec-D.

You should be aware of the following information before using this type of decongestant:

- Systemic decongestants are often combined with other drugs, such as antihistamines, *antipyretics* (fever reducers), *analgesics* (pain relievers), *antitussives* (cough suppressants), or *expectorants* (mucus expellers), to provide multisymptom relief for headaches, fever, cough, sleeplessness, and other symptoms of the common cold, flu, allergic rhinitis, and other ailments.
- Oral forms of systemic decongestants used consistently over a long period of time can cause side effects such as sleeplessness, nervous agitation, loss of appetite, dryness of mouth and sinuses, difficulty urinating, high blood pressure, and heart palpitations.

  If you have a medical condition such as arrhythmia, coronary heart disease, hypertension, hyperthyroidism, glaucoma, diabetes, enlarged prostate, or urinary dysfunction, don't take any product containing a decongestant without first checking with your doctor.

WARNING

- Because of the stimulant effect of oral decongestants, use caution when giving them to children. (Believe it or not, most parents aren't interested in unduly stimulating their kids.)

Nasal decongestants

Nonprescription decongestant nasal sprays and nose drops can provide quick and effective short-term relief of nasal congestion. However, you should use them only occasionally, and not for more than three to five days in a row, because long-term or consistent use can result in adverse effects such as *nasal rebound* (see the nearby sidebar of the same name).

WARNING

Never use decongestant nasal sprays and drops with children under the age of 6 without a doctor's supervision. If you use them properly, OTC decongestants generally produce few side effects other than occasional sneezing and dry nasal passages. The most common OTC decongestant drugs and brand-name medications include

- **Naphazoline,** found in Privine
- **Oxymetazoline,** found in Afrin, Allerest, Dristan Long Lasting, and Sinex Long Lasting
- **Phenylephrine,** found in Neo-Synephrine, Sinex, and Little Remedies Decongestant Nose Drops (0.125 percent formula for infants and children)
- **Xylometazoline,** found in Otrivin

The dosage levels and usage frequency of these medications vary depending on each product's formulation and method of application. As always, carefully read all product instructions and warnings before using any medication.

NASAL REBOUND

No, nasal rebound isn't a new basketball play. This condition, more formally known as *rhinitis medicamentosa,* results from prolonged overuse of OTC decongestant nasal sprays and drops. Overusing such medications can irritate and inflame the mucous membranes in your nose more than before you used the spray, leading to more serious nasal congestion.

Unfortunately, some people increase their use of the product as their congestion worsens, leading to a vicious cycle in which more use produces more congestion. When this happens, higher doses don't clear the congestion — they only make it worse. To break this vicious cycle, stop using your OTC decongestant. Your doctor may also need to prescribe a short course of oral or nasal corticosteroids to clear your nasal congestion and allow you to tolerate the discontinuation of the OTC decongestant.

Remember, the warning on the label that directs you not to use nasal decongestant spray or drops longer than three to five days really means three to five days and no more. If your stuffy nose persists beyond that point, consider using an oral decongestant.

The long-lasting products require no more than two doses a day to remain effective, but the short-acting products may work for only one to four hours. Therefore, you may need to apply short-acting products several times a day, as long as you don't exceed safe dosage levels and don't use the product continuously without checking first with your physician.

Two for the Nose: Combination Products

Antihistamines and decongestants can often be more effective in treating the full range of allergic rhinitis symptoms if you combine them in one preparation. You can find numerous oral OTC combination products in tablet, capsule, or liquid form on store shelves.

An antihistamine, such as chlorpheniramine or brompheniramine, is often combined with a decongestant, such as pseudoephedrine. These products are also frequently combined with other active ingredients — pain relievers, cough suppressants, and fever reducers, for example — to provide relief for a variety of ailments, such as cold and flu symptoms.

The onset of relief and dosage frequency vary with different products. Tablets and capsules generally come in two varieties:

- **Rapid release:** These medications start working quickly but usually lose effectiveness within four hours.
- **Sustained release:** As you may expect, these products work the opposite way: They act slower but last longer than rapid release medications — usually six to eight hours or longer.

Nondrowsy OTC formulas may contain pain relievers, fever reducers, cough suppressants, or other active ingredients for multisymptom relief but don't contain first-generation antihistamines, which cause drowsiness. Therefore, these formulas don't usually provide relief from the sneezing, runny nose, and itchy nose, eyes, and throat that are significant symptoms of allergic rhinitis.

WARNING

The decongestant in combination products can still cause sleeplessness, nervous agitation, loss of appetite, dryness of mouth and sinuses, high blood pressure, and heart palpitations, especially in older patients. Likewise, the antihistamine in combination products can still cause drowsiness. For example, the antihistamine diphenhydramine (Benadryl) is the active ingredient in many popular sleep aids, such as Nytol. See the following section for more details.

Analyzing the upside and downside

Because of their sedative effects, OTC antihistamines are generally thought of as *downers.* Likewise, because decongestants act as stimulants, they're considered *uppers.* You may think that combining these two types of drugs in a single OTC product cancels out both the sedative and stimulant side effects. However, a person may experience both the upper and the downer effects at the same time — the worst of both worlds, in other words — resulting in an agitated, jittery form of drowsiness.

If a patient's condition warrants a combination product, their physician usually prescribes a nonsedating antihistamine formulated with a decongestant, such as Allegra-D, or possibly a less sedating antihistamine formulated with a decongestant, such as Zyrtec-D. The decongestant (pseudoephedrine) in these products usually doesn't produce as much of a stimulant effect as other decongestants, such as phenylpropanolamine, which the FDA removed from the market. As a result, the patient gets the benefits of both a nonsedating antihistamine and a less stimulating decongestant, minimizing the adverse downer or upper side effects.

Most OTC liquid forms are short-acting, which means they typically require up to four doses a day. However, you may prefer to use liquids, especially syrup forms that contain flavorings (and sometimes sweeteners), to treat children as well as adults who have trouble swallowing tablets and capsules. Another option is to use chewable formulations of these products.

One-size-fits-all may not suit your condition

Although combination antihistamine and decongestant products may work well when you need quick relief, the products are less suitable for long-term use because you can't adjust the dosage levels of the individual active ingredients. Each dose, whether in tablet, capsule, or liquid form, delivers the same amount of antihistamine and decongestant (as well as other active ingredients) to your system whether you need relief from one symptom or the full range of ailments.

If you're considering switching combination products because the one you're using doesn't seem effective, check the active ingredients on other medications to make sure you don't buy the same antihistamine and decongestant combination under a different brand name.

The Advantages of Using Nasal Sprays

It's always preferable to target the exact location of a medical condition rather than treating the whole body with a systemic medication while hoping the affected area will benefit from a wide-spectrum approach. When treating allergic rhinitis, the advantage of using a nasal spray rather than an oral medication is that the spray directs the medication appropriately to the lining of the nasal passages.

This targeted treatment provides the greatest benefit of the medication in relieving allergy nasal symptoms, such as sneezing, itchy nose, runny nose, and nasal congestion, while still minimizing potential side effects. The bottom line is that it's safer and more effective to use targeted medical therapy to improve your nasal symptoms rather than medicating your entire body.

Using nasal corticosteroids

TECHNICAL STUFF

The most effective medication currently available for controlling the four major symptoms of allergic rhinitis — sneezing, itching, runny nose, and nasal congestion — is *nasal corticosteroid spray.* Patients and the general public commonly refer to these corticosteroid products as *steroids* or *cortisone.* However, in this book, we use the proper term *corticosteroid* for these types of nasal sprays to avoid confusion.

MYTH BUSTER

The negative perception some people have of steroids is mostly due to attempts by some athletes to build up muscle mass by abusing *anabolic steroids.* In fact, the steroids used in corticosteroid nasal sprays are a completely different type of drug than anabolic steroids (which are actually male hormones).

The spray is administered by an *aqueous* (nonaerosol) mechanical pump. The following information can help you and your doctor decide whether nasal corticosteroids can work for you:

- Nasal corticosteroid sprays suppress the inflammation of nasal passages, thereby clearing your nose for easier breathing.
- Nasal corticosteroid sprays are most effective if you use them daily as preventive medications. For a guide to safe dosage levels, see Table 10-2.

TABLE 10-2 Nasal Corticosteroid Sprays

Active Ingredient	Formulation	Brand Name	Total Usual Daily Dose for Children under 12 Years (See Formulation Details)	Total Usual Daily Adult Dose
Budesonide	32 mcg per inhalation	Rhinocort Allergy Spray	1–2 sprays each nostril once per day (6–11 years)	1–2 sprays each nostril once per day
Fluticasone	50 mcg per inhalation	Flonase Allergy Relief Flonase Sensimist	1 spray each nostril once per day; may be increased to 2 sprays each nostril once per day (4–11 years)	2 sprays each nostril once per day or 1 spray each nostril twice per day; may be decreased to maintenance dose of 1 spray each nostril once per day
Fluticasone	93 mcg per inhalation	XHANCE	18 years of age and older	Prescription only. Approved for treatment of nasal polyps, 1–2 sprays each nostril twice per day
Mometasone	50 mcg per inhalation	Nasonex Allergy Nasal Spray	1 spray each nostril once per day; may be increased to 2 sprays each nostril once per day (3– 11 years)	2 sprays each nostril once per day
Triamcinolone	55 mcg per inhalation	Nasacort 24-Hour Nasal Allergy Spray	2 sprays each nostril once per day (6–11 years)	2 sprays each nostril once per day

mcg = microgram

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. Many of the branded nasal sprays are now available in generic form. For further information, check with your pharmacist or physician. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

- Never exceed dosage levels with these products to minimize the possibility of the medication causing systemic side effects, such as those associated with oral corticosteroids.
- Nasal corticosteroid sprays provide gradual relief of allergic rhinitis symptoms. Initially, you may need to use the medication for several days before the spray suppresses your nasal inflammation. Full effectiveness may require two to three weeks of daily application.

- Use nasal corticosteroids only if your nose is clear enough for the spray to penetrate. If your nose is seriously congested, you may need to use a nasal decongestant for the first three to five days just prior to administering the nasal corticosteroid spray.
- To avoid injuring your *septum* (the bone that divides the nose into two nostrils), direct the spray away from your septum and slightly toward your ears. You may even want to spray the product once in the air to judge the force of the spray before using it in your nose.
- Because of its gentler action on the nasal lining, using an aqueous formulation can minimize the typical adverse side effects of nasal corticosteroid sprays, such as nasal irritation, burning, drying, and nosebleeds.

Trying combination nasal sprays

Studies have compared the combination of fluticasone and azelastine (Dymista) to its individual components and a *placebo* (an inactive substance) in patients 12 and older with at least a two-year history of seasonal allergic rhinitis. The studies showed that the combination of a nasal steroid with a nasal antihistamine was superior to a nasal steroid alone. The combination spray led to quicker symptom relief and better control than either drug alone.

Therefore, patients suffering from seasonal allergies may want to try a combination spray if a nasal steroid alone isn't adequate. The two combinations available by prescription are the following:

- **Dymista (azelastine and fluticasone):** This combination nasal spray, also available as a generic product, works well to treat seasonal allergies for adults and children 6 and older. The combination of azelastine, an antihistamine, and fluticasone, a corticosteroid that decreases swelling and inflammation in the nose, is usually prescribed when symptoms don't improve with intranasal steroid medications alone. The typical dose is 1 spray in each nostril twice daily.
- **Ryaltis (olopatadine and mometasone):** This combination nasal spray is prescribed to treat symptoms of allergic rhinitis. Olopatadine is an antihistamine, which prevents the effects of histamine, and mometasone is a corticosteroid, which has anti-inflammatory effects. The dose for adults and children over 12 is 2 sprays in each nostril twice per day.

WARNING

STEROIDS TO AVOID

Although nasal corticosteroid sprays are highly effective and generally safe for both adults and children when administered under a physician's care, using other forms of steroids is less advisable and potentially unsafe. The following steroids may be harmful to you:

- **Oral corticosteroids:** We advise using quick bursts of short-acting oral steroids (such as prednisone or methylprednisolone) only in cases of severe nasal rebound or nasal polyps, where a decongestant nasal spray can't penetrate sufficiently to decongest your nose. In such cases, you may require a short course of oral corticosteroids to sufficiently clear your congestion so you can use a nasal corticosteroid spray.
- **Intranasal injections:** Cortisone shots into the nose aren't appropriate treatment for allergic rhinitis because of the potential for serious side effects, including vision complications and possibly even blindness.

WARNING

Although some evidence indicates that nasal corticosteroid sprays are highly effective and safe for children, some doctors are concerned about the possible effects the sprays may temporarily have on the growth rate of children who use them. If your child uses a nasal corticosteroid spray, make sure their physician knows about your concerns so they can accurately monitor your youngster's growth.

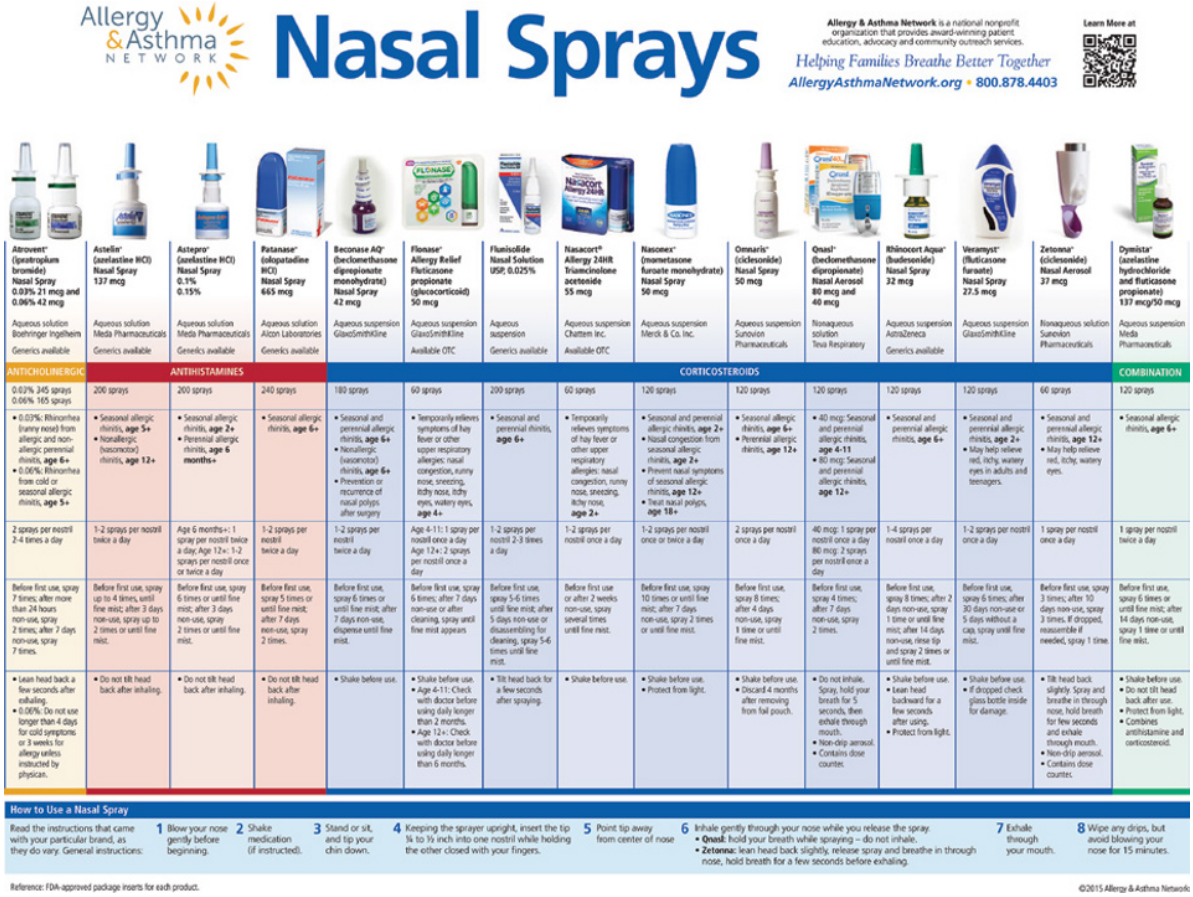
Knowing nasal sprays

SEE YOUR DOCTOR

We've included a chart with details about many of the nasal sprays we mention in this chapter, listed with name, formulation, and dosage for your reference. We want to thank the Allergy & Asthma Network (AAN) for providing this user-friendly resource (see Figure 10-1). The names, formulations, and doses in the AAN's chart are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

ALLERGY & ASTHMA NETWORK

The Allergy & Asthma Network (AAN) is a "national non-profit organization dedicated to ending needless death and suffering due to asthma, allergies and related conditions through outreach, education, advocacy and research." For more information, contact AAN directly at `https://allergyasthmanetwork.org/` or 800-878-4403.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Astepro® (azelastine HCl) Nasal Spray 0.1% 0.15%
Patanase® (olopatadine HCl) Nasal Spray 665 mcg
Beconase AQ® (beclomethasone dipropionate monohydrate) Nasal Spray 42 mcg
Flonase® Allergy Relief Fluticasone propionate (glucocorticoid) 50 mcg
Flunisolide Nasal Solution USP, 0.025%
Nasacort® Allergy 24HR Triamcinolone acetonide 55 mcg
Nasonex® (mometasone furoate monohydrate) Nasal Spray 50 mcg
Omnaris® (ciclesonide) Nasal Spray 50 mcg
Qnasl® (beclomethasone dipropionate) Nasal Aerosol 80 mcg and 40 mcg
Rhinocort Aqua® (budesonide) Nasal Spray 32 mcg
Veramyst® (fluticasone furoate) Nasal Spray 27.5 mcg
Zetonna® (ciclesonide) Nasal Aerosol 37 mcg
Dymista® (azelastine hydrochloride and fluticasone propionate) 137 mcg/50 mcg
Aqueous solution Boehringer Ingelheim
Generics available
Aqueous solution Meda Pharmaceuticals
Generics available
Aqueous solution Meda Pharmaceuticals
Generics available
Aqueous solution Alcon Laboratories
Generics available
Aqueous suspension GlaxoSmithKline
Aqueous suspension GlaxoSmithKline
Available OTC
Aqueous suspension
Generics available
Aqueous suspension Chattem Inc.
Available OTC
Aqueous suspension Merck & Co. Inc.
Aqueous suspension Sunovion Pharmaceuticals
Nonaqueous solution Teva Respiratory
Aqueous suspension AstraZeneca
Generics available
Aqueous suspension GlaxoSmithKline
Nonaqueous solution Sunovion Pharmaceuticals
Aqueous suspension Meda Pharmaceuticals
ANTICHOLINERGIC
ANTIHISTAMINES
CORTICOSTEROIDS
COMBINATION
0.03% 345 sprays
0.06% 165 sprays
200 sprays
200 sprays
240 sprays
180 sprays
60 sprays
200 sprays
60 sprays
120 sprays
120 sprays
120 sprays
120 sprays
120 sprays
120 sprays
60 sprays
120 sprays
• 0.03%: Rhinorrhea (runny nose) from allergic and non-allergic perennial rhinitis, age 6+
• 0.06%: Rhinorrhea from cold or seasonal allergic rhinitis, age 5+
• Seasonal allergic rhinitis, age 5+
• Nonallergic (vasomotor) rhinitis, age 12+
• Seasonal allergic rhinitis, age 2+
• Perennial allergic rhinitis, age 6 months+
• Seasonal allergic rhinitis, age 6+
• Seasonal and perennial allergic rhinitis, age 6+
• Nonallergic (vasomotor) rhinitis, age 6+
• Prevention or recurrence of nasal polyps after surgery
• Temporarily relieves symptoms of hay fever or other upper respiratory allergies: nasal congestion, runny nose, sneezing, itchy nose, itchy eyes, watery eyes, age 4+
• Seasonal and perennial allergic rhinitis, age 6+
• Temporarily relieves symptoms of hay fever or other upper respiratory allergies: nasal congestion, runny nose, sneezing, itchy nose, age 2+
• Seasonal and perennial allergic rhinitis, age 2+
• Nasal congestion from seasonal allergic rhinitis, age 2+
• Prevent nasal symptoms of seasonal allergic rhinitis, age 12+
• Treat nasal polyps, age 18+
• Seasonal allergic rhinitis, age 6+
• Perennial allergic rhinitis, age 12+
• 40 mcg: Seasonal and perennial allergic rhinitis, age 4-11
• 80 mcg: Seasonal and perennial allergic rhinitis, age 12+
• Seasonal and perennial allergic rhinitis, age 6+
• Seasonal and perennial allergic rhinitis, age 2+
• May help relieve red, itchy, watery eyes in adults and teenagers.
• Seasonal and perennial allergic rhinitis, age 12+
• May help relieve red, itchy, watery eyes.
• Seasonal allergic rhinitis, age 6+
2 sprays per nostril
2-4 times a day
1-2 sprays per nostril
twice a day
1-2 sprays per nostril
twice a day
1-2 sprays per nostril
twice a day
1-2 sprays per nostril
twice a day
Age 4-11: 1 spray per nostril once a day
Age 12+: 2 sprays per nostril once a day
1-2 sprays per nostril 2-3 times a day
1-2 sprays per nostril once a day
1-2 sprays per nostril once or twice a day
2 sprays per nostril once a day
40 mcg: 1 spray per nostril once a day
80 mcg: 2 sprays per nostril once a day
1-4 sprays per nostril once a day
1-2 sprays per nostril once a day
1 spray per nostril once a day
1 spray per nostril twice a day
Before first use, spray 7 times; after more than 24 hours non-use, spray 2 times; after 7 days non-use, spray 1 time.
Before first use, spray up to 4 times, until fine mist; after 3 days non-use, spray up to 2 times or until fine mist.
Before first use, spray 6 times or until fine mist; after 3 days non-use, spray 2 times or until fine mist.
Before first use, spray 5 times or until fine mist; after 7 days non-use, spray 2 times.
Before first use, spray 6 times or until fine mist; after 7 days non-use or after cleaning, spray until fine mist appears
Before first use, spray 6 times; after 7 days non-use or after cleaning, spray until fine mist appears
Before first use, spray 5-6 times until fine mist; after 5 days non-use or disassembling for cleaning, spray 5-6 times until fine mist.
Before first use or after 2 weeks non-use, spray several times until fine mist.
Before first use, spray 10 times or until fine mist; after 7 days non-use, spray 2 times or until fine mist.
Before first use, spray 8 times; after 4 days non-use, spray 1 time or until fine mist.
Before first use, spray 4 times; after 7 days non-use, spray 2 times.
Before first use, spray 8 times; after 2 days non-use, spray 1 time or until fine mist; after 14 days non-use, rinse tip and spray 2 times or until fine mist.
Before first use, spray 6 times; after 30 days non-use or 5 days without a cap, spray until fine mist.
Before first use, spray 3 times; after 10 days non-use, spray 3 times. If dropped, reassemble if needed, spray 1 time.
Before first use, spray 6 times or until fine mist; after 14 days non-use, spray 1 time or until fine mist.
• Lean head back a few seconds after exhaling.
• 0.06%: Do not use longer than 4 days for cold symptoms or 3 weeks for allergy unless instructed by physician.
• Do not tilt head back after inhaling.
• Do not tilt head back after inhaling.
• Do not tilt head back after inhaling.
• Shake before use.
• Shake before use.
• Age 4-11: Check with doctor before using daily longer than 2 months.
• Age 12+: Check with doctor before using daily longer than 6 months.
• Tilt head back for a few seconds after spraying.
• Shake before use.
• Shake before use.
• Protect from light.
• Shake before use.
• Discard 4 months after removing from foil pouch.
• Do not inhale. Spray, hold your breath for 5 seconds, then exhale through mouth.
• Non-drip aerosol.
• Contains dose counter.
• Shake before use.
• Lean head backward for a few seconds after using.
• Protect from light.
• Shake before use.
• If dropped check glass bottle inside for damage.
• Tilt head back slightly. Spray and breathe in through nose, hold breath for few seconds and exhale through mouth.
• Non-drip aerosol.
• Contains dose counter.
• Shake before use.
• Do not tilt head back after use.
• Protect from light.
• Combines antihistamine and corticosteroid.
How to Use a Nasal Spray
Read the instructions that came with your particular brand, as they do vary. General instructions:
1 Blow your nose gently before beginning.
2 Shake medication (if instructed).
3 Stand or sit, and tip your chin down.
4 Keeping the sprayer upright, insert the tip ¼ to ½ inch into one nostril while holding the other closed with your fingers.
5 Point tip away from center of nose
6 Inhale gently through your nose while you release the spray.
• Qnasl: hold your breath while spraying – do not inhale.
• Zetonna: lean head back slightly, release spray and breathe in through nose, hold breath for a few seconds before exhaling.
7 Exhale through your mouth.
8 Wipe any drips, but avoid blowing your nose for 15 minutes.
Reference: FDA-approved package inserts for each product.
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FIGURE 10-1: AAN Nasal Sprays chart.

Controlling Symptoms with Cromolyn Sodium

Cromolyn sodium, an anti-inflammatory OTC nasal spray, may be highly effective in controlling symptoms of allergic rhinitis when you use it properly. (You can find this medicine under the brand name NasalCrom.) Cromolyn sodium stabilizes mast cells, thereby preventing the release of histamine and other chemical mediators that can cause nasal inflammation.

To help determine whether cromolyn sodium nasal spray can work for you, check out these facts about its recommended use and effectiveness:

- Cromolyn sodium is most effective if you start using it two to four weeks before exposure to allergens. In cases of occupational allergic rhinitis or limited exposure to allergens, using the spray immediately prior to an isolated, single allergen exposure (before mowing the lawn or visiting a home with a pet) may provide some relief if your nasal passages aren't already congested.
- If allergic rhinitis symptoms are already present, you may need a short course of a combination antihistamine-decongestant for the first few days you use cromolyn sodium.
- Because cromolyn sodium has an excellent safety profile and produces no significant side effects, doctors may often prescribe it for children and pregnant women.
- You can purchase cromolyn sodium in a metered spray form. The recommended dosage for adults and children older than 6 is 1 spray in each nostril, 3 to 6 times per day, at regular intervals. Administer cromolyn sodium to children between 2 and 6 years of age only under the supervision of a doctor.

Reducing Mucus with Anticholinergic Sprays

Ipratropium bromide is the active ingredient in the *anticholinergic products* (drying agents) that sell under the brand name Atrovent Nasal Spray. Anticholinergics counter cholinergic activity by blocking *acetylcholine* — a neurotransmitter that stimulates mucus production — from attaching to chemical receptors in the nose. Therefore, these sprays reduce the amount of mucus in your nose.

SKIER'S NOSE

Ever notice how often skiers blow their noses? You may have seen several boxes of tissues at the bottom of the ski lifts at your favorite resort. The tissues are there because of what people call *skier's nose,* which is triggered by cold air and is symptomatic of vasomotor rhinitis (inflammation of the nasal tissues that it triggered by environmental factors such as strong odors, cold air, alcohol ingestion, and spicy foods).

Atrovent Nasal Spray works well to prevent skier's nose as well as jogger's nose, if you use it before being exposed to cold air, and also for treatment after symptoms appear. However, doctors also use anticholinergic eye drops similar to ipratropium bromide (the active ingredient in Atrovent) to dilate patients' eyes, so make sure you keep the spray away from your eyes or you won't see that mogul coming right at you.

Some basic facts about anticholinergic sprays include

- Ipratropium bromide effectively reduces runny nose, as seen in conditions such as *vasomotor* (nonallergic rhinitis; see the nearby "Skier's nose" sidebar) or the common cold.
- Ipratropium bromide has little effect on other allergic rhinitis symptoms, such as stuffy nose, sneezing, or itchy nose.
- Your doctor can prescribe Atrovent Nasal Spray in two strengths: 0.03 percent for relief of runny nose associated with allergic and nonallergic rhinitis in adults and children older than 6, and 0.06 percent for relief of runny nose associated with the common cold in adults and children older than 12.
- The typical dose is 2 sprays per nostril 2 or 3 times per day (0.03 percent) or 3 or 4 times per day (0.06 percent) at regular intervals.

Treating Rhinitis with Leukotriene Modifiers

Leukotrienes play a significant role in asthma attacks. These chemicals, found in the mast cells that line the airways of the lungs and nose, enhance mucus production, constrict the bronchial passages, and promote further inflammation of the respiratory lining by attracting additional inflammatory cells into the airways.

Leukotriene modifiers, such as *montelukast* (Singulair), approved for the treatment of asthma (see Chapter 12), are drugs that block leukotriene activity at the receptor site, thus decreasing the amount of mucus generated by exposure to allergens.

WARNING

Leukotriene modifiers may be used to treat patients whose allergic rhinitis symptoms don't respond solely to antihistamines. However, the FDA announced that it is requiring a *black box warning* (used for medications that carry serious safety risks) for montelukast (Singulair) because of the risk of neuropsychiatric events (mental side effects) associated with this drug. The warning advises healthcare providers to avoid prescribing montelukast for patients with mild allergic rhinitis.

Keeping an Eye Out for Allergic Conjunctivitis

Allergic conjunctivitis often coexists with allergic rhinitis. In fact, most of the same allergens involved in allergic rhinitis can trigger allergic conjunctivitis. Characteristic symptoms of this ailment include redness of the eyes and the underside of the eyelids, and swollen, itchy, and watery eyes.

Because the mechanisms of allergic rhinitis and allergic conjunctivitis are similar, conjunctivitis is often treated with some of the same types of drugs used to control rhinitis in solutions specifically formulated for safe use in the eye. Treatment can include

- **Prescription antihistamines:** Two newer second-generation prescription antihistamines, *levocabastine* (Livostin) and *emedastine* (Emadine), appear to be more effective than OTC antihistamines for the treatment of allergic conjunctivitis. Normal recommended dosage for both products is one drop per eye up to four times a day for up to two weeks.
- **OTC decongestants:** Products include Clear Eyes, Clear Eyes ACR, Visine A.C., Visine L.R., Visine Moisturizing, and Visine Original.
- **Combinations of OTC antihistamines and decongestants:** Products include Naphcon-A, Vasocon-A, Ocuhist, Prefrin, and VasoClear.

- **Mast cell stabilizers:** This group of medications, available by prescription, inhibits mast cells from releasing chemical mediators of inflammation, potentially preventing allergic symptoms from developing. These types of eye-drop products include
  - **Cromolyn sodium (Crolom, Opticrom):** Cromolyn sodium works best if you use it preventively, prior to allergen exposure, but you also can administer it on a regular basis, four times a day. For infrequent allergen exposure (when visiting someone with pets, for example), use cromolyn sodium immediately before you expect to be exposed to the allergen. This product has also demonstrated some effectiveness in treating forms of *vernal conjunctivitis* (a chronic eye condition that can cause severe burning and intense itching and marked sensitivity to bright light).
  - **Nedocromil sodium (Alocril):** This medication, available in a metered-dose inhaler formulation for the treatment of asthma (Tilade), is also approved in the United States as an *ophthalmic* (eye) solution. Doctors can prescribe it for itching eyes associated with allergic conjunctivitis in adults and children as young as 3. This product provides effective relief of both the early and late-phase allergic response (delayed reaction). The normal dosage for Alocril is one or two drops in each eye twice per day.
  - **Lodoxamide (Alomide):** This drug isn't approved for use specifically for allergic conjunctivitis, but it has shown some effectiveness in clinical trials as a treatment for vernal conjunctivitis. Normal dosage is one or two drops per eye, four times per day, for up to three months.
- **Nonsteroidal anti-inflammatory drugs (NSAIDs):** Ketorolac (Acular) is a type of NSAID that can relieve the itching of seasonal allergic conjunctivitis. Normal dosage is one drop per eye, four times per day.
- **Combination antihistamine and mast cell stabilizer:** The most recent additions to allergic conjunctivitis eye products are olopatadine (Patanol, Pataday OTC) and ketotifen (Zaditor OTC), which are available OTC, and azelastine (Optivar Rx) and epinastine (Elestat Rx), which are available by prescription in the United States. The normal recommended dosage for Patanol is one drop in each affected eye twice per day, at an interval of six to eight hours. For Zaditor, the recommended dosage is one drop in each eye twice daily, every 8 to 12 hours. The recommended dosage for Optivar and also for Elestat is one drop in each eye twice a day.

WARNING

Doctors prescribe corticosteroid eye drops for severe cases of allergic conjunctivitis that are unresponsive to the medications we describe in the preceding bullet points. However, you should monitor your use of corticosteroid eye drops closely because using these products improperly can lead to very serious adverse side effects. Don't ever use corticosteroid eye drops if you suspect you have a viral infection of the eyes, such as herpes, because using these products may prolong the course of and increase the severity of the viral infection. In addition, prolonged use of corticosteroid eye drops may result in glaucoma, vision complications, and cataract formation. Consider consulting a qualified *ophthalmologist* (eye doctor) before routinely using corticosteroid eye products.

TIP

Patients with allergic conjunctivitis should use eye drops during peak pollination seasons in addition to their other prescribed medication for allergic rhinitis to minimize eye discomfort. Try not to rub your eyes. Even though they may itch, rubbing them usually only makes matters worse. Instead, gently rinsing your eyes with clean water or a soothing OTC sterile irrigating solution can often wash away pollen and help relieve your symptoms.

If you experience severe allergic conjunctivitis, your doctor may prescribe an oral antihistamine, eye drops, or a combination of two different eye-drop products for maximum relief of your symptoms.

Complicating Your Allergies and Asthma: Sinusitis

If you've ever had cold or nasal symptoms that didn't seem to go away, you may have been suffering from a form of *sinusitis*. This usually painful condition develops as a result of swollen nasal and sinus passages frequently caused by allergic rhinitis. Many asthma patients often confuse sinusitis symptoms with the symptoms of a cold, flu, or allergy.

Sinusitis is one of the most common health problems in the United States. Current estimates are that sinusitis affects 35 million Americans. Because of the congestion and discomfort sinusitis causes, it's one of the most common reasons for doctor visits in the United States.

SEE YOUR DOCTOR

Consult a doctor as soon as you suspect you may have sinusitis. Complications, such as aggravation of asthma, recurrent bronchitis, otitis media, and nasal polyps, can occur if you manage your sinusitis poorly. Chronic sinus infections can result in swollen *adenoids* (glands located in the upper airway just behind the nasal cavity) that may require surgery to remove. On a more positive note, studies show that asthma patients who effectively manage their sinusitis can significantly improve their respiratory symptoms.

Recognizing common causes

In a significant number of sinusitis cases, allergic rhinitis precedes the start of a sinus infection. Research shows that more than half of all children in the United States who receive treatment for sinusitis also have allergic rhinitis.

TECHNICAL STUFF

Vasomotor rhinitis, a nonallergic form of rhinitis that results from sudden temperature changes or exposure to tobacco smoke, pollutants, and other irritants, can also contribute to sinusitis. Swimmers, divers, fliers (passengers as well as flight crews), and other people with this form of rhinitis who frequently experience pressure and weather changes may be particularly prone to developing sinusitis if they don't effectively manage their rhinitis symptoms.

Other factors (you may have one or more of these) that can increase your chances of developing sinusitis include

- **Upper respiratory viral infections:** Viruses, such as those associated with the common cold, are the most frequent cause of sinusitis.
- **Bacterial infections:** The same family of germs that can cause acute otitis media (*Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis*) can cause acute bacterial sinusitis. Unlike viral infections, this type of sinusitis responds to antibiotic therapy.
- **Fungal infections:** This type of sinusitis infection can develop in otherwise healthy patients who have been on long-term antibiotic treatment or have been taking oral corticosteroids on a chronic basis. *Aspergillus* is the most common fungus that causes these types of cases and is also frequently implicated in cases of *allergic fungal sinusitis.* Characteristic signs and symptoms of this recurring fungal infection, which can often affect individuals with allergic rhinitis or asthma, are sinus infections and *nasal polyps* (growths in the nose).

- **Nasal rebound:** Overuse of OTC nasal decongestants can predispose you to sinusitis. (See the "Nasal rebound" sidebar earlier in this chapter for more information.)
- **Anatomical obstructions:** Nasal polyps, other growths, enlarged adenoids (particularly in children), and a deviated *nasal septum* (the great divide between the nostrils) can increase your chances of developing sinusitis.
- **Other diseases:** Patients with *cystic fibrosis,* in which abnormally thick mucus is produced and the function of the *cilia* (tiny hairlike projections of certain types of cells that sweep debris-laden mucus through the airways) is impaired, frequently suffer from sinus infections. In addition, AIDS and other immune-deficiency diseases often weaken the body's defenses to the point where bacteria and viruses can cause many types of infections, including sinusitis. Patients with compromised immune systems may be particularly vulnerable to various forms of fungal sinus infections.

Diving into sinus science

Allergists refer to the sinuses that surround your nose — called *paranasal sinuses* — when they discuss sinusitis. *Para* is Greek for around or near; *nasal*, of course, refers to the nose; and *sinus* is Latin for a hollow place. Your sinuses are hollow cavities in the bones that surround your nasal cavity (see Figure 10-2) — hence *sinusitis*, which means inflammation (*itis*) of the sinuses.

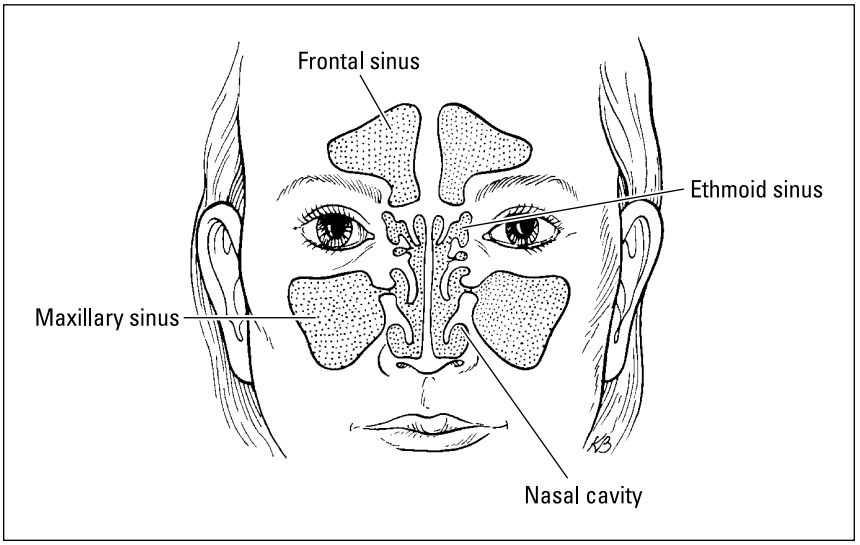


FIGURE 10-2: Your sinuses are actually hollow cavities that surround your nasal cavity.

The three types of paranasal sinuses come in pairs (one on each side of the nose) and are named for the bones that house them. They include

- **Maxillary sinuses:** The largest of the sinuses, these sinuses are located in your cheekbones.
- **Frontal sinuses:** These sinuses reside in your forehead above your eyes.
- **Ethmoid sinuses:** These sinuses are directly behind your eyes and nose.

The other sinus affected by sinusitis is the *sphenoid* sinus, located behind your nose near the base of your brain.

TECHNICAL STUFF

Sinus infections usually affect the maxillary, frontal, and ethmoid sinuses. The most common complication affects the orbit around the eye, causing *cellulitis* (a potentially serious bacterial infection of the skin and the tissue beneath your skin) and possibly forming an *abscess* (a localized collection of pus surrounded by inflamed tissue). Patients with this type of infection may look as though they've taken a hard punch to the eye. Because the sphenoid sinus is near the brain, an infection in this area, although rare, is usually associated with infections in all the other sinuses (*pansinusitis*) and can have very serious consequences if infected fluids spread to the central nervous system. Untreated sinusitis has the potential to lead to life-threatening conditions, such as *meningitis* (an infection of the membranes that envelop the brain and spinal cord) and brain abscesses.

TECHNICAL STUFF

Your maxillary sinuses are present at birth, along with immature ethmoid sinuses, which begin to fully develop when you're between 3 and 7 years old. Therefore, contrary to previous medical opinion, children under 5 can experience sinus infections that require appropriate therapy. If your young child has allergic rhinitis, effectively treating their condition is vital in reducing their risk of developing sinusitis.

Sinuses are a vital part of your body's defense against the airborne bacteria, viruses, irritants, and allergens you constantly inhale. Under normal circumstances, the mucus in your sinuses traps most of these intruders. Cilia sweep the particle-laden mucus through connecting *ostia* (sinus drainage openings) into your nasal passages, which drain it into your throat. From your throat, the mucus moves into your stomach, where your digestive system can neutralize and eventually eliminate the offending substances.

In addition to helping clear your upper respiratory tract of particle-laden mucus, your sinuses serve other important roles. For example, your sinuses act as

- Air pockets that lighten your skull — otherwise, your head would be too heavy for your neck. Calling someone an airhead is actually an anatomically correct statement.

- Resonance chambers that provide space for your voice to *resonate* (produce a full sound).
- Climate adjusters, warming and humidifying the air you inhale.
- Facial insulators, which also warm the base of your brain, located directly behind your nose.
- Shock absorbers, protecting the inside of your skull from injury.

Allergic rhinitis irritates the nasal and sinus linings, causing them to swell, which narrows the sinus drainage openings into the nasal cavity. At the same time, your immune system's response to allergic rhinitis increases mucus production. This combination of increased mucus flow and a swollen sinus lining overwhelms the cilia's ability to sweep out the mucus, which then becomes infected.

Think of a swiftly flowing stream. If the stream dams up, the water usually stagnates and turns into a breeding ground for all sorts of organisms. The same process applies to your sinuses, which is why it's crucial to prevent them from turning into swamps.

Classifying sinusitis

Although no universal definition exists for the various presentations of sinusitis, most doctors base their sinusitis classifications on the duration and types of symptoms involved. Therefore, doctors often use the following terms to classify cases of sinusitis:

- **Acute sinusitis:** Symptoms of acute sinusitis persist for up to three or four weeks, although some doctors may diagnose symptoms that continue for up to eight weeks as acute. Typical symptoms of acute sinusitis include
  - Upper respiratory infection.
  - Runny nose with infected mucus that often appears as cloudy, thick, yellowish, or greenish nasal discharge.
  - Cloudy, yellowish, or greenish postnasal drip (often of such a quantity that you may need to swallow frequently).
  - Facial pain or pressure around cheeks, eyes, and lower nose (mainly in adults, less commonly in children), especially while bending over or moving vigorously (for example, during exercise).
  - Nasal congestion, headache, fever, and cough.
  - A reduction or loss of the sense of smell, pain in the upper teeth or upper jawbone, and *halitosis* (bad breath).

- In some children, nausea and vomiting due to gagging on infected mucus. Some children have a persistent nocturnal (nighttime) cough and halitosis.

- **Chronic sinusitis:** When your condition lasts longer than four weeks, doctors usually consider you a chronic sufferer. In many cases, chronic sinusitis can last for months with combinations of the same symptoms as acute sinusitis, although you may not have a fever. For this reason, many people with chronic sinusitis think they suffer from frequent or constant colds.
- **Recurrent sinusitis:** Doctors usually define recurrent sinusitis as three or more episodes of acute sinusitis per year. The recurring episodes may have different causes. If you have recurrent sinusitis, your doctor may refer you to an allergist to determine whether allergies are the underlying cause of your condition. (See Chapter 11 for more details on allergy testing.)

Diagnosing sinusitis

Often, your doctor can diagnose sinusitis based on your symptoms and medical history. Your doctor may ask questions like the following:

- When did you first notice the symptoms?
- What hurts? Where do you feel the pain?
- Does your family have a history of allergies and sinus problems?
- What have you done to treat your symptoms? What types of medications have you taken, and what has been their effect?

Your doctor also conducts a physical exam of your nose and sinuses to confirm the diagnosis. This exam may include

- Taking your temperature to check for fever and listening to your chest to see whether the infection has spread to your lungs.
- Lightly tapping your forehead and cheekbones to check for sensitivity in your frontal and maxillary sinuses.
- Looking for infected mucus in your nose and the back of your throat. This exam may require insertion of a flexible fiber-optic device, known as an *endoscope,* or a fiber-optic *rhinoscope,* so your doctor can clearly view potentially infected areas.

TECHNICAL STUFF

Your doctor may use sophisticated imaging techniques to confirm the diagnosis of sinusitis. *Computed tomography* (CT) is currently the gold standard and, in many cases, is replacing the use of less accurate sinus X-rays. A CT scan, also known as a *CAT scan*, is a diagnostic test that combines X-rays with state-of-the-art computer technology. This test uses a series of X-ray beams from many different angles to create cross-sectional images of your body — in this case, of your head and sinuses. With computer assistance, these images are assembled into a three-dimensional picture that can display organs, bones, and tissues in great detail.

Determining the best course of treatment

To effectively treat your sinusitis, you need to effectively manage your allergic rhinitis. In many cases, appropriately treating your allergic rhinitis also improves your sinusitis. As we explain in Chapter 7, avoidance and allergy-proofing are crucial tools you can use to effectively treat your allergies. Chapter 13 provides an in-depth explanation of allergy medications that you may find appropriate for your condition.

In addition to addressing your allergic rhinitis, doctors can prescribe a variety of treatments for sinusitis, ranging from medication to irrigation to surgery.

Antibiotics

REMEMBER

Antibiotics are the most common medications that doctors prescribe to clear up the bacterial (not viral) infection in your sinuses. When taking antibiotics, keep the following in mind:

- Because the blood flow to your sinuses is poor, you may need to take your prescribed antibiotics for a while before you notice a beneficial effect. However, most cases of acute sinusitis respond to antibiotic treatment within two weeks.
- In cases of chronic sinusitis, don't be surprised if your doctor prescribes a six- to eight-week course of antibiotic therapy combined with intranasal steroids (see Chapter 12) to eliminate your bacterial infection.
- In some cases of acute or chronic sinusitis, you may notice a sudden improvement in your symptoms soon after you start a course of antibiotics, and you may consider stopping the medication at that point. However, take the complete course of antibiotics to ensure that all the bacteria have been completely eliminated.

WARNING

Other medications

In addition to prescribing antibiotics to clear up the bacterial infection in your sinuses, your doctor may prescribe medications to treat symptoms of allergic rhinitis, which we describe extensively in earlier sections of this chapter.

Irrigation

Your doctor may advise you to use a nasal douche cup, nasal spray bottle, nasal bulb syringe, neti pot, Waterpik with nasal attachment, or some other type of nasal wash device to irrigate your nostrils with warm saline solution. You can use these devices at home to relieve pressure and congestion in your nasal passages. Ask your doctor for specific instructions on how to use nasal wash devices.

Getting steamed

Your doctor may also recommend a simple home remedy to help clear your sinuses and relieve discomfort. This remedy consists of inhaling steam to liquefy and soften crusty mucus while moisturizing your inflamed passages.

Use the following method for inhaling steam:

1. **Boil water in a kettle on the stove.**
2. **Carefully pour the boiling water into a pan or basin on a low table.**
3. **Sit at the table and drape a towel over your head, leaning over the pan or basin to form a kind of human tent with your head as the pole.**
4. **Hold your face a few inches above the steaming water and breathe the steam through your nose for approximately ten minutes.**

Two steam treatments a day may provide relief. However, you still need to deal with the underlying cause of the sinus infection, so we don't advise relying on this home remedy as the only therapy for your infectious sinusitis.

Also consider obtaining a steam inhaler, such as the MyPurMist Handheld Vaporizer and Humidifier, which converts water to vapor without the risk of being scalded by boiling water. This portable handheld steam inhaler produces a fine instant mist, which is temperature controlled and provides relief from nasal and sinus symptoms.

Sinus surgery

If other treatment methods don't provide effective relief, you may need surgery, especially if physical obstructions, such as a deviated septum or nasal polyps, contribute to your condition. However, if allergic rhinitis is the underlying cause

of your sinusitis, surgery alone won't resolve your sinus problems. You must continue managing your allergic rhinitis to avoid further complications. By the same token, treating your allergies alone won't reverse the damage that sinusitis may have already caused.

If your doctor thinks surgery is advisable, they will refer you to an ear, nose, and throat specialist, or ENT, otherwise known as an *otolaryngologist* (remember that word the next time you do a crossword puzzle). Before you consider surgery, make sure your doctor thoroughly reviews your medical history and evaluates your clinical condition.

TIP

Never hesitate to ask your surgeon for further information about your planned surgical procedure, such as how long the procedure takes, where and when it will be performed, what the possible complications are, and how soon you can get back to work or school.

The good news about sinus surgery is that the two most common procedures are minimally invasive. An ENT can perform them on an outpatient basis with local anesthesia, although they may use general anesthesia in certain cases. The two procedures most often used are

- **Antral puncture and irrigation:** This procedure opens up your sinuses so they can drain and irrigate properly, but is used less often since the advent of fiber-optic surgery.
- **Functional endoscopic sinus surgery:** This procedure is more complex than antral puncture and irrigation. Functional endoscopic sinus surgery often involves enlarging the ethmoid and maxillary sinus openings into the nasal cavity and removing and cleaning the infected sinus membranes, resulting in improved drainage. This procedure reestablishes the ventilation of your ethmoid, maxillary, and frontal sinuses. Otolaryngologists perform this type of surgery with high-tech computer-assisted instruments and navigation devices to ensure pinpoint accuracy.

An ounce of prevention . . .

TIP

If you have allergic rhinitis, consider taking the following preventive measures to keep your sinuses clear if you come down with an upper respiratory infection (such as the common cold) or experience an allergy attack:

- **Take the appropriate medications.** See Tables 10-1 and 10-2 in this chapter for a complete listing.

- **Drink plenty of water.** Water keeps your mucus thin and fluid so your sinuses can drain more easily.
- **Be nice to your nose.** Blow it gently, preferably one nostril at a time.
- **Avoid flying.** If you have to travel by air while you have a cold or an allergy attack, use a nasal decongestant spray prior to takeoff. The spray prevents the sudden pressure changes from blocking your sinuses and ears.
- **Avoid swimming.** You probably won't feel like going to the beach or the pool if you have a cold or allergy attack, and your sinuses definitely won't enjoy the pressure changes that swimming and diving involve. (Scuba diving wouldn't be a good idea either.)

Sounding Off about Otitis Media

Otitis media is an inflammation of the middle ear, as well as a condition in which fluid accumulates in your ear. This condition is different from *otitis externa*, which affects the external auditory canal and is commonly known as *swimmer's ear.* Based on the definitions of sinusitis and rhinitis we provide in this chapter, you can probably already guess what *otitis* means: an inflammation (*itis*) of the ear (*otikos* in Greek). *Media* means middle, by the way. Infectious organisms, such as bacteria and viruses, often affect the middle ear. Otitis media can develop as a result of allergic rhinitis and from complications of sinusitis.

Middle ear infections and fluid in the ear are especially common in young children and infants. In fact, otitis media is the most common reason for pediatric visits in the United States, with doctors treating at least 10 million children annually for ear infections. Otitis media can have serious consequences for youngsters, in particular by adversely affecting their development and learning ability due to potential hearing loss.

The most common forms of otitis media are

- **Acute otitis media (AOM):** This condition involves inflammation and infection of the middle ear and Eustachian tube (see "Getting an earful," later in the chapter, for more on the Eustachian tube). The peak incidence of AOM is between 6 months and 1 year of age, decreasing with age and with fewer episodes after age 7.

- **Otitis media with effusion (OME):** Doctors also refer to this condition as *serous otitis media* — fluid in the middle ear. OME, which occurs commonly in children from age 2 to 7, can lead to hearing loss if not treated properly.

Revealing common causes

In a significant number of cases, allergic rhinitis precedes an ear infection. A long-term study of 2,000 children found that 50 percent of the patients with chronic and recurrent ear infections who were 3 or older had allergic rhinitis.

Other conditions that can increase your chances of developing ear infections include

- Sinusitis. The same factors that can lead to sinus infections, such as exposure to allergens, tobacco smoke, pollutants, and other irritants, can contribute to ear infections.
- Enlarged adenoids.
- Unrepaired cleft palate.
- Nasal polyps.
- Pacifier use by babies.
- Defective or immature immune system.
- Benign or malignant tumors.
- Teething. Some physicians believe that teething in young children can contribute to ear infections, but no one has established a direct connection.

TIP

Many of the conditions in the previous list affect infants and young children. Always ask your physician to check for infection and fluid in the middle ear anytime your child is ill.

Getting an earful

The visible part of your ear — that funny-looking protrusion on the side of your head — is only the tip of the iceberg. Most of your ear's functions take place inside your skull in chambers, tubes, and passages that register and conduct sound and also provide your sense of balance.

TECHNICAL STUFF

Figure 10-3 shows the parts that make up the ear:

- **Outer ear:** Also known as the *pinna,* this structure is what many people think of as the ear. The primary function of this skin-covered flap of elastic cartilage is to funnel sound into the middle ear and keep your eyeglasses on the side of your head.
- **Middle ear:** This air-filled chamber is bordered by the *tympanic membrane* (commonly known as the *eardrum*) and small bones that enable your eardrum to function. Through its connection (the *Eustachian tube*) to the *nasopharynx* (back of the nose), your middle ear also equalizes the air pressure on both sides of your eardrum.
- **Inner ear:** Your inner ear contains sensory receptors that provide your hearing and balance. The hearing receptors are enclosed in the *cochlea,* a fluid-filled chamber, while the balance receptors are in the semicircular canals.
- **Eustachian tube (ET):** Your Eustachian tube is an extension of the middle ear that connects to the nasopharynx. The ET, which is often the origin of ear infections, serves three important functions:
  - The ET provides ventilation for your middle ear.
  - The ET helps equalize air pressure inside your ear, buffering your eardrum from the force of external air, and helps disperse the energy of sound waves from your inner ear into your throat.
  - Because your ET is closed most of the time, it serves as an important barrier to viruses, bacteria, irritants, and allergens that enter your middle ear. Similar to their function in your sinuses, cilia in the middle ear sweep debris-laden mucus from your middle ear through the ET into the back of your nasal cavity. The cilia prepare the mucus for drainage into your throat and eventually into your stomach.

    The ET briefly opens to allow the cilia to sweep mucus away when you swallow, yawn, sniff, or strain. In many children, however, the ET doesn't fully develop until age 6, causing it to ineffectively ventilate, clear, or protect the middle ear. Therefore, large numbers of young children get middle ear infections.

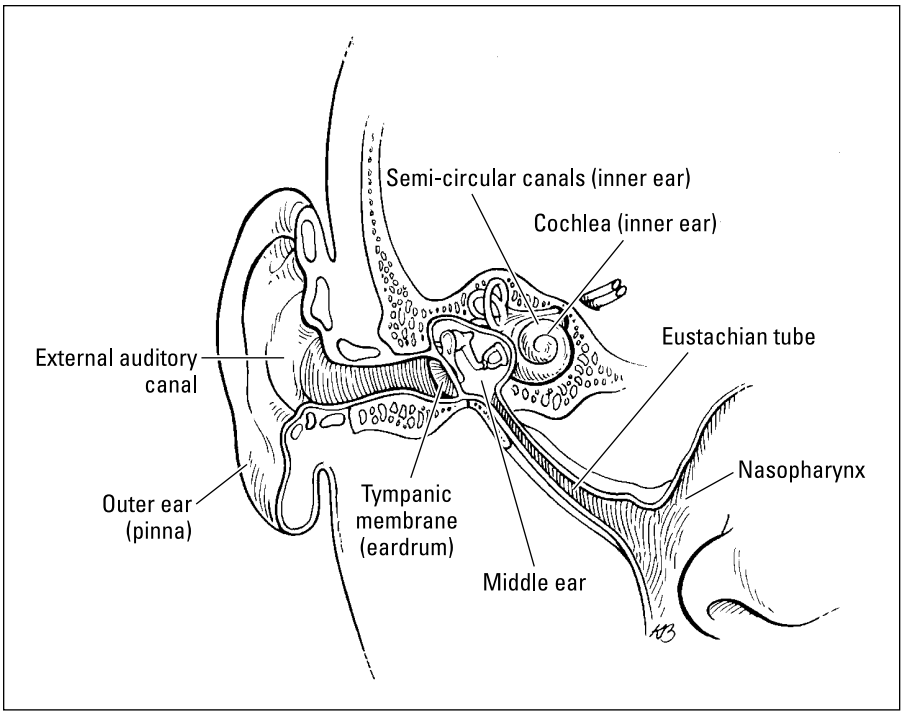


FIGURE 10-3: See how the less visible part of your ear is laid out.

Acute otitis media

Many people suffer from *acute otitis media*, or AOM — an inflammation and infection of the middle ear and Eustachian tube — in early childhood. The main symptoms include

- Earache — sometimes with intense, stabbing pains — and fever. Occasionally, vomiting and diarrhea accompany this symptom.
- Possible hearing loss and occasional dizziness and ringing in the affected ear.
- With infants, high fever, irritability, and a tendency to pull on the affected ear.
- In some cases, discharge of infected fluid from the middle ear (if your eardrum has been perforated).

WARNING

An AOM infection generally develops as a result of an allergic, bacterial, or viral ailment that inflames your nose, sinuses, middle ear, and Eustachian tube. Your ET may swell shut, trapping infected fluid, which then presses on your eardrum, causing the pain you associate with an earache. If you don't resolve this situation, infected fluids can eventually reach the membranes that cover your brain, leading to meningitis and even death.

Because sinusitis and otitis media often coexist, doctors usually treat these conditions with the same medications. Treatment of AOM often includes a course of antibiotics (available by prescription only) to rid your middle ear of infection. The antibiotic drugs doctors commonly prescribe include

- Amoxicillin (Amoxil) or amoxicillin/potassium clavulanate (Augmentin)
- Clarithromycin (Biaxin) or azithromycin (Zithromax)
- Trimethoprim-sulfamethoxazole (Bactrim or Septra)
- A third-generation cephalosporin antibiotic, such as cefuroxime (Ceftin), cefpodoxime (Vantin), cefprozil (Cefzil), or cefixime (Suprax)

WARNING

If you're allergic to penicillin, make sure your doctor knows. Some people who have penicillin allergies may also have adverse reactions to cephalosporin medications.

Otitis media with effusion

When you have *otitis media with effusion*, or OME (also known as *serous otitis media*), your middle ear traps infected or sterile fluid. The most common symptoms of OME are

- Plugged-up ears (similar to the discomfort you may experience when descending in an airplane)
- Some hearing loss

TIP

Children with OME may not show obvious symptoms. However, if your child acts inattentive (other than the obvious times when children don't seem to hear you asking them to clean their room), doesn't seem to hear well (for example, they always want the television volume turned up loud), or talks loudly, make sure your doctor examines their ears. Undetected or poorly treated OME can result in hearing loss, poor language development, learning disorders, and eventual behavioral problems.

OME treatments can include nonprescription oral decongestants and nasal decongestant sprays, as well as nasal corticosteroid sprays. (For more information on these types of medicines, see the medication tables earlier in this chapter.

REMEMBER

If your child has chronic OME that lasts more than six to eight weeks, your pediatrician may refer them to an ENT for surgery. The most common OME treatment procedures are

- **Adenoidectomy:** If your child's Eustachian tube is chronically blocked and your child is older than 3, your doctor may recommend removing their adenoids. (Removing the tonsils is no longer an effective or appropriate procedure for treatment of ear problems.)
- **Myringotomy:** The ENT makes a small incision in the eardrum that permits drainage of the trapped fluid. This procedure is helpful both for diagnostic purposes (to identify infecting organisms) and to relieve the severe pain, pressure, and fever associated with an acute middle ear infection.
- **Tympanostomy:** This procedure includes surgically inserting small plastic tubes (known as *pressure equalization* or *PE tubes*) in the eardrum to equalize air pressure in the ear and allow drainage of fluid from the middle ear and ET down to the nasopharynx. ENTs usually perform tympanostomies with a general anesthetic, and occasionally with local anesthetic (for older children or adults), as an outpatient procedure. In most cases, doctors recommend that PE tubes remain in place for 6 to 18 months or until they fall out. Children often don't notice the tubes after they've been in place for a while. Generally, children with PE tubes shouldn't go swimming. However, in some cases, an ENT may fit your child with earplugs, making water activities a possibility.

Diagnosing ear infections

The first step in diagnosing suspected ear infections usually involves examining your middle ear. Your doctor uses an *otoscope* (a tool that shines a light to help examine the ear canal and ear drum) to look for an obvious sign of infection. AOM often appears as a swollen, red, inflamed bulging of the tympanic membrane (eardrum) with poor or no movement. OME can appear as a pink or white, opaque, withdrawn tympanic membrane with poor or no movement.

Other diagnostic procedures for both AOM and OME may include

- **Audiometry:** This procedure evaluates the effect of chronic middle ear effusions on a person's hearing. Audiometry is especially important for children because hearing loss can cause delayed speech and language development.
- **Tympanometry:** This procedure measures the eardrum's response at various pressure levels and helps diagnose middle ear effusions and Eustachian tube dysfunction.

Taking preventive measures

As with sinusitis, one of the most important steps you can take to prevent ear infections, if you also have allergic rhinitis, is to effectively treat your allergies, which includes using the avoidance measures we describe in Chapter 7 and taking the appropriate medications, if necessary, to manage your allergic rhinitis symptoms, as we explain earlier in this chapter.

You also need to take the preventive measures we describe in the "Complicating Your Allergies and Asthma: Sinusitis" section of this chapter to keep your sinuses clear if you have an allergy attack or a cold or other upper respiratory infection.

3 Controlling Your Asthma

IN THIS PART . . .

Understand the role of immunotherapy (allergy shots) in treating asthma and allergies.

Manage your asthma symptoms with long-term controller drugs and relieve asthma episodes with short-term rescue medications.

Review how inhalers and nebulizers deliver your medication.

Check out the newest asthma medications and therapies.

IN THIS CHAPTER

- Evaluating skin test results
- Making informed choices about immunotherapy
- Considering newer forms of immunotherapy

Chapter 11
Getting Allergy Tested and Allergy Shots

Depending on the severity and nature of your asthma and allergies (such as allergic rhinitis, or *hay fever*) and the degree of your exposure to allergens that trigger your respiratory symptoms, avoidance measures and *pharmacotherapy* (treatment with medications) may not be the only tools you require for effectively managing your condition. You may also need to identify and address root causes of your condition instead of simply treating your symptoms. As a result, your doctor may refer you to an allergist for skin tests and possible immunotherapy.

Doctors use *skin tests* to confirm that your symptoms result from allergies instead of some other cause. Doctors also use skin tests to identify, if possible, the specific allergens that trigger your asthma symptoms and allergic reactions. Later in this chapter, we explain the two most common types of allergy skin testing doctors use.

Meanwhile, the advisability of *immunotherapy,* also known as *allergy shots, desensitization, hyposensitization,* or *allergy vaccination,* depends on whether skin testing provides clear evidence that you're allergic to specific allergens, what those allergens are, and how they correlate with your medical history.

This chapter provides a closer look at both of these specialized diagnostic and treatment procedures, so you know what to expect.

Diagnosing Allergies with Skin Tests

Allergists consider skin tests the most reliable and precise method for diagnosing allergies.

Doctors use skin tests to determine whether a minute dose of a suspected allergen — which an allergist or clinic staff member administers in solution form on or just below your skin (*subcutaneously*) — produces a small-scale, localized positive response known as a *wheal and erythema (flare) reaction.* A wheal and erythema reaction is a small red swelling of your skin that resembles a mosquito bite, hive, or bump at the site of the allergen test. A positive reaction confirms that you have sensitivity to the administered allergen but may also indicate your specific sensitivity level to that allergen.

After completion of the skin tests, you should remain under observation for at least 30 minutes. If the tests produce a positive reaction, your allergist or test administrator examines and measures the resulting wheal and erythema. Clinicians use these measurements to help determine your level of sensitivity to the specific allergen that was administered. If your physician concludes that you need immunotherapy, knowing your level of sensitivity to the allergen often is important in determining a safe starting dosage for your first series of allergy shots.

Pins and needles

Most allergists use two types of skin tests to evaluate allergic ailments:

- **Prick-puncture:** Clinicians perform this test, sometimes referred to as a *scratch test,* on the surface of your back or on your forearm.
- **Intracutaneous:** Allergists perform this test, also known as *intradermal testing,* only when the prick-puncture test fails to produce a significant positive result and your medical history suggests that an allergy is causing the symptoms. The intracutaneous test involves a series of small injections of allergen solution in rows just below the surface of the skin on your arm or forearm.

For both prick-puncture and intracutaneous tests, a positive reaction usually appears within 20 minutes. With either test, you needn't worry about someone

turning you into a pincushion or sticking you with a giant syringe. The intracutaneous test uses only very fine needles just beneath the surface of the skin and, like the prick-puncture test (on the surface of the skin), produces minimal discomfort.

Skin tests and antihistamines: Not a good mix

If, after carefully reviewing your condition and history, your doctor advises skin testing, you probably need to stop using your antihistamine medications (and other products in certain cases, but usually not your asthma drugs) for several days prior to the test. The presence of these drugs in your body can interfere with the skin test results. However, it's unlikely that you'll need to stop most of your other medications.

Never abruptly stop taking your asthma medications without first checking with your doctor. Fortunately, most asthma medications don't interfere with allergy skin testing.

The following list offers some general guidelines about discontinuing various common products; your allergist can provide you with more exact instructions, based on the specific medications you take.

- Discontinue older sedating first-generation over-the-counter (OTC) antihistamines such as Benadryl, Chlor-Trimeton, Dimetapp, Dayhist, and similar products for 48 to 72 hours before your skin test.
- You may need to stop using newer nonsedating second-generation antihistamines such as Allegra, Clarinex, Claritin, Zyrtec, or Xyzal for as long as two to four days prior to testing. Intranasal antihistamines such as olopatadine and azelastine should also be discontinued a few days before testing.
- Make sure your allergist knows if you're taking beta-blockers (Inderal, Tenormin) or monoamine oxidase inhibitors (Nardil, Parnate), because special precautions must be taken when administering skin tests to patients who take these drugs. They sometimes can render epinephrine ineffective. *Epinephrine* is a rescue medication doctors use for emergency treatment in the rare cases when severe allergic reactions occur following skin testing.
- Because some of them have antihistamine effects, certain antidepressants also can interfere with skin tests. If you're taking tricyclic antidepressants (Elavil or Sinequan), for example, check with the doctor who prescribed them to find out whether you can safely stop taking them for a brief period or whether substituting another antidepressant (such as Prozac or Paxil) that doesn't have antihistaminic properties is possible. If discontinuing these drugs

to undergo skin testing is permitted, you may need to stop taking them for three to five days prior to your test.

Don't ever stop taking prescribed medication (for any medical condition) without first checking with your physician.

REMEMBER

- Skin conditions such as contact dermatitis, eczema, psoriasis, or lesions (irritations) in the skin test area also can interfere with your test results. Make sure your doctor knows about such conditions before you undergo any skin testing.

Starting from scratch: Prick-puncture procedures

Allergists consider prick-puncture tests the most convenient and cost-effective screening method for detecting *specific immunoglobulin E (IgE) antibodies*, which are produced by your immune system in response to a wide variety of inhalant and food allergens (see Chapter 7 and Chapter 8 for details about the immune system).

When performing a prick-puncture test, an allergist or other qualified medical professional first places a drop of a suspected allergen (in solution form) on your back or your forearm. The test administrator then uses a device that pricks, punctures, or scratches the area to see whether the allergen produces a reaction. The device merely scrapes the skin, without drawing blood.

Alternatively, multiple prick-puncture tests can be administered simultaneously with a *Multi-Test* — a sterile, disposable multiple skin test applicator with eight heads. This procedure uses an applicator that has a specific allergen extract on each of its eight applicator heads and is applied directly to the patient's skin, as shown in Figure 11-1.

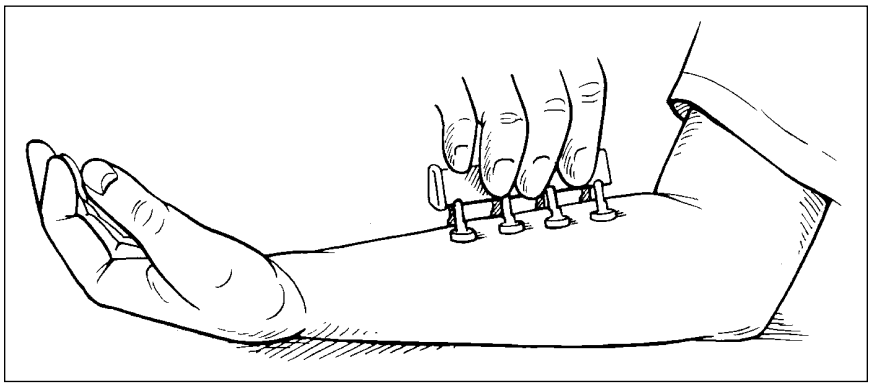


FIGURE 11-1: A multiple skin test applicator can be used to administer prick-puncture skin tests.

You may have to undergo as many as 70 prick-puncture tests to conclusively identify inhalant allergens. The number of tests you receive varies according to factors such as the area where you live, work, or go to school, and the types of allergen exposure you receive. In many cases, your doctor requires fewer tests.

The number of prick-puncture tests your doctor may need to administer to determine your specific food allergies varies from 20 to 80. However, only a few foods (milk, eggs, peanuts, tree nuts, fish, shellfish, soy, wheat, and sesame) account for the vast majority of cases of allergic food reactions. By first taking a detailed medical history, your doctor may need to perform only a few carefully chosen food allergen skin tests to confirm a likely diagnosis of *food hypersensitivity,* or food allergy (see Chapter 8).

WARNING

Some food allergies, such as peanut hypersensitivity, can trigger serious reactions. Whenever a patient says, "Doctor, anytime I eat anything that has peanuts in it, I nearly die," physicians take the patient's word for it. If you suffer from specific severe food allergy reactions, we strongly advise against prick-puncture tests — and never recommend intracutaneous tests — because the resulting positive reaction can produce serious or even life-threatening results. Before you have any kind of skin test, always tell your doctor about any serious food reactions you may have experienced in the past.

Getting under your skin: Intracutaneous testing

If your prick-puncture tests are inconclusive, your doctor may need to perform up to 40 intracutaneous tests — but usually not in the case of suspected food allergies — to produce a significant positive reaction and confirm the diagnosis of an allergy.

WARNING

Because intracutaneous tests involve injecting an allergen extract just below the surface of your skin, the risk — although small — of a widespread systemic reaction exists. Rarely should an intracutaneous test be done for a particular allergen without a prior prick-puncture test for that same allergen. The type of adverse reaction that can result from administering a particular allergen usually is far less serious with a prick-puncture test, and it alerts your allergist to the potential danger of performing an intracutaneous test with that allergen.

Because of a variety of factors, including the types of allergen extracts your allergist administers, delayed reactions can occur with prick-puncture tests, but they occur more often following intracutaneous tests. The characteristic signs of these reactions include swollen, numb red bumps at the skin test site.

Delayed reactions can develop 3 to 10 hours after your test and may continue for up to 12 hours thereafter. The bumps usually disappear 24 to 48 hours later. These delayed reactions, which are known as *late-phase skin reactions*, aren't a sign of immediate hypersensitivity (which we explain in Chapter 6), and allergists often tell their patients to ignore these late reactions.

Skin test side effects

Skin testing occasionally produces adverse side effects in ultrasensitive individuals, but only rarely. As you'd expect, adverse reactions occur far less frequently with prick-puncture tests than with more invasive intracutaneous tests. These side effects can range from large local reactions on the skin to systemic reactions, such as sneezing, coughing, tightness of the chest, swelling of the throat, itchy eyes, and postnasal drip.

In very rare cases, *anaphylaxis* (anna-fih-*lack*-sis), a life-threatening reaction that affects many organs simultaneously, has occurred following a skin test. For that reason, medical facilities where doctors perform skin tests need to have appropriate emergency equipment and drugs on hand in the unlikely event that using these items becomes necessary.

Blood testing for allergies

Although most allergists consider skin tests the gold standard for diagnosing allergies, they may not work for every patient. Your allergist may advise diagnosing your allergic condition with a blood test known as an *enzyme-linked immunosorbent assay* (ELISA). Your doctor may recommend a blood test instead of a skin test for the following reasons:

- Your prescribing physician advises you not to discontinue medications such as antihistamines and antidepressants that can interfere with skin test results.
- You suffer from a severe skin condition such as eczema or psoriasis over a large part of your body, and your doctor is unable to find a suitable skin site for testing.
- Your sensitivity level to suspected allergens is so high that any administration of those allergens may result in potentially serious side effects (for example, a history of life-threatening reactions to the ingestion of peanuts).
- Problematic behavioral, physical, or mental conditions prevent you from cooperating with the skin-testing process.

Because ELISA can require only one blood sample to analyze many allergens, this method may seem more convenient than skin testing. However, other than the exceptions listed earlier in this section, most allergists rarely use ELISA, because it isn't as specific as skin testing and can result in an incomplete profile of your allergies. In addition, ELISA is more expensive and time-consuming because a laboratory must analyze blood samples and report test results, which often takes at least two days. If your results are inconclusive, your allergist must perform the test again and wait for new results. In comparison, skin testing usually provides results on the spot within 15 to 30 minutes.

Reviewing Immunotherapy

Immunotherapy (also known as *allergy shots, desensitization, hyposensitization,* or *allergy vaccination*) currently is the most effective form of treating the underlying immunologic mechanism that causes allergic conditions such as allergic rhinitis, allergic conjunctivitis, allergic asthma, and allergies to insect stings. An alternative way to treat allergies without injections is by sublingual (under the tongue) immunotherapy, also known as SLIT. The Food and Drug Administration (FDA) has approved SLIT with tablets to treat ragweed, grass, and dust mite allergy.

The SLIT tablets are administered under the tongue for one to two minutes and are then swallowed as they dissolve. Treatment is usually given for at least three years. Both subcutaneous immunotherapy (SCIT) and sublingual immunotherapy (SLIT) help patients increase their tolerance to inhalant allergens and eventually reduce symptoms. SLIT is also being studied for the treatment of food allergies.

Seeing how immunotherapy works

TECHNICAL STUFF

How exactly does immunotherapy work? The following information may help you understand it better:

- **Decreasing production of IgE antibodies:** IgE antibodies are the agents that bind with allergens at receptor sites on the surfaces of mast cells, initiating the release of potent chemical mediators of inflammation such as histamine and leukotrienes. These chemicals trigger allergic reactions and asthma symptoms. (See Chapter 6 for an extensive explanation of the complex immune system responses involved in asthma and allergies, such as allergic rhinitis.)
- **Initiating the production of other allergen-specific immunoglobulin G (IgG) antibodies:** *Allergen-specific IgG antibodies* also are known as *blocking antibodies.* Immunotherapy can stimulate your body to produce blocking

antibodies, which compete with mast-cell bound IgE for antigen, preventing the initial sensitization, activation, and subsequent release of potent chemical mediators of inflammation from these cells. To find out more about the cast of Ig (immunoglobulin) antibodies and other characters involved in the complex immune system responses that result in allergy and asthma symptoms, turn to Chapter 6 (especially if you're a budding immunologist).

- **Stabilizing the actual mast cells and basophils** (basophils are a type of white blood cell that plays an important role in the immune system)**:** Immunotherapy's stabilizing function means that even if IgE antibodies and allergens cross-link on the surface of these cells, your potential allergic reaction is usually less severe because the release of potent chemical mediators of inflammation is reduced. In addition, immunotherapy can decrease the actual number of mast cells and basophils in the affected areas. This reduction in activation and numbers of these cells also results in suppression of the inflammatory late-phase allergic response following allergen exposure (see Chapter 6).

Deciding whether immunotherapy makes sense for you

Immunotherapy may be appropriate for treating your allergies, and therefore helping you manage your asthma more effectively, depending on the following factors:

- You've found it impractical, or even impossible, to effectively avoid allergens that trigger your asthma symptoms and allergic reactions, because the life you lead inevitably results in allergen exposure.
- Your respiratory symptoms are consistently severe or debilitating.
- Managing your asthma or allergies requires prohibitively expensive courses of medication, which produce side effects that adversely affect your overall health and quality of life. If the health and financial costs of multiple allergy drugs outweigh their benefits, immunotherapy may make more sense for you.
- Allergy testing provides conclusive evidence of specific IgE antibodies, enabling your allergist to identify the allergens that trigger your symptoms.

- You haven't experienced serious adverse side effects (as a result of skin testing) to the allergens your doctor will use in your subsequent course of immunotherapy.
- You can make the commitment to see the therapy process through. Immunotherapy isn't a quick fix, and it requires a significant investment of your time.

If you suffer from an unstable heart condition and take beta-blockers such as Inderal, if you have high blood pressure and take ACE inhibitors (Capoten, Vasotec), or if you take MAO inhibitors (Nardil, Parnate) for depression or anxiety, don't consider immunotherapy unless your physician advises you that the benefits of starting immunotherapy outweigh the risks of discontinuing those medications.

Taking solid tablets: Sublingual immunotherapy

Sublingual immunotherapy (SLIT) is an alternative to injections in which a disintegrating tablet gradually dissolves under the tongue (*sublingually*), ensuring that patients consistently receive an exact dose of prescribed allergen extracts. In the United States, grass pollen, ragweed pollen, and house dust mite tablets are available.

The main advantages of SLIT over SCIT are safety and the convenience of oral therapy that's self-administered at home. The first dose is usually given in a medical office. The main disadvantage of SLIT is its reliance on consistent patient self-administration: If doses are missed, the results may not be satisfactory. Also, tablet therapy appears to be less effective than allergy shots.

Immunotherapy can significantly improve your respiratory symptoms, reducing your need for allergy medication, which, in turn, makes this treatment the closest thing to a currently available cure for allergies and the respiratory symptoms they trigger. However, always tell your allergist:

- Whenever you're considering taking medications — including OTC drugs — for allergies or nonallergic conditions
- About any changes in your medical condition, even if the changes may not seem directly connected to your allergies
- If you're pregnant or planning to become pregnant (see the nearby sidebar)

Your cooperation is key for an effective immunotherapy program. Follow and maintain the shot schedule (see the next section) your allergist prescribes as closely as possible. However, be aware of the following factors that may lead to adverse reactions:

WARNING

- **Exercise:** Make sure you don't engage in strenuous physical activity for at least one hour before and two hours after your allergy shots. Exercising at these times can increase your risk of experiencing a serious adverse reaction because exercise increases your blood circulation, potentially resulting in a rapid absorption of the allergen from the shot and possibly causing a severe reaction.
- **Illness:** If you run a fever, tell your allergist. Receiving an allergy shot while you're ill isn't a good idea because your fever symptoms can make detecting an adverse reaction to the shot difficult.
- **Immunizations:** Try to avoid scheduling any other immunizations on the same day as your allergy shots because potential adverse effects from the immunization can make a reaction from an allergy shot difficult to identify. If you do get an immunization on the day of your scheduled allergy shots, let your allergist know; they may advise you not to get your allergy shots that same day.

Getting shots: Subcutaneous immunotherapy

Subcutaneous immunotherapy (SCIT), in the form of injections or shots, is the most effective and reliable method of administering the specially prepared, diluted allergen extracts that allergists use when providing immunotherapy. If needles give you nightmares, relax. Allergy shots given subcutaneously tend to be much less painful or traumatic than the deep intramuscular shots often needed to effectively administer immunizations or certain medications (such as cortisone or penicillin). That's because doctors usually administer allergy shots with the same type of fine needle they use for intracutaneous testing, thus causing minimal discomfort.

AUTHOR SAYS

It's often amazing how well kids handle allergy shots after getting over their initial fears about that first shot. After the first shot, SCIT usually isn't a problem for most children, especially when they notice their respiratory symptoms are starting to improve. We don't claim that kids love getting allergy shots (or going to the doctor for anything besides a lollipop), but they usually quickly discover that receiving these injections beats not being able to breathe properly.

Allergens that doctors commonly use in immunotherapy for allergic asthma, allergic rhinitis, and allergic conjunctivitis include extracts of inhalant allergens

from tree, grass, and weed pollens; mold spores; dust mites; and sometimes animal dander.

In preparing your allergen extract (serum or vaccine), your doctor includes only those allergens for which you demonstrated sensitivity in your skin testing. If your skin tests show sensitivity to multiple allergens (you're sensitive to many grass and weed pollens, for example), your allergist may mix all the different grass extracts into one vial and all the different weed extracts into another vial. Preparing the serum in such combinations ensures that you receive only one shot for each group of extracts, thus reducing the number of injections you need for effective therapy.

Your allergist may even determine that mixing doses of all your allergens into a single shot on a particular visit is an option for you based on:

- Your allergic sensitivity
- The volume of extract that needs to be administered
- The types of allergen extracts used for your therapy

In some cases, for your comfort, it may be preferable to split the required dose of your allergy shot into two or more separate injections.

REMEMBER

Although this treatment can greatly reduce your allergy symptoms, immunotherapy isn't considered a guaranteed permanent cure for asthma and allergies (see Chapters 5 and 6). You need to continue practicing avoidance measures while receiving immunotherapy because doing so can significantly enhance the effectiveness of your treatment.

PREGNANCY AND IMMUNOTHERAPY

If you become pregnant while receiving immunotherapy, you'll be glad to know that your allergy shots are safe during pregnancy. In fact, your allergist may advise you to continue receiving immunotherapy, possibly at a reduced dosage, to minimize any risk of reactions to allergy shots and to continue to provide relief from your respiratory symptoms.

If you stop treatment, you run the risk of experiencing worsening symptoms. This worsening can lead to an increased need for medication that may not be desirable during your pregnancy. However, if you're already pregnant and are considering whether to start a course of immunotherapy, your allergist may advise you to delay beginning this form of treatment until after your baby is born.

Sticking to shot schedules

The most effective way of administering immunotherapy is by providing *perennial therapy*, which involves receiving shots of allergen extracts year-round. Studies show that perennial therapy provides the longest and most successful reduction in the level of sensitivity to specific allergens.

REMEMBER

A typical course of perennial immunotherapy may follow these steps:

- Your allergist begins your therapy by administering shots once or twice a week, starting with a very small amount of a diluted dose of allergen extracts.
- Your allergist gradually increases your allergen dosage by increasing the amount and concentration of the extract week by week until you reach the maintenance dose in about three to six months. The *maintenance dose* refers to a predetermined amount of maximal concentration, or the highest strength you can tolerate without producing adverse reactions.
- After you reach your maintenance dose, allergy symptom relief usually begins. When relief starts, you can continue receiving shots at the maintenance dose level. Likewise, your allergist may extend the interval between your shots from one week to as many as four, depending on your response to the treatment and the levels of exposure you encounter in your environment.

Every time you receive your allergy shots, expect to spend at least 20 minutes after the treatment in your allergist's office so a medical staff member can inspect and evaluate the areas of skin around your shots and monitor you for any early signs of anaphylaxis. Another benefit of staying in your allergist's office after your shots: In the rare event that you experience a severe reaction, qualified medical personnel can immediately provide emergency assistance.

Committing to a long-term relationship

For inhalant allergens, an effective immunotherapy program usually requires shots for at least three to five years. In many cases, if your sensitivity to allergens improves during the course of immunotherapy, you can maintain your level of allergy improvement for several years (or even lifelong in some cases) after discontinuing the shots.

SEE YOUR DOCTOR

However, in some cases, withdrawing from immunotherapy results in the reappearance of allergic symptoms. Therefore, your allergist needs to evaluate the specifics of your individual case when considering the possibility of discontinuing immunotherapy.

Considering side effects

WARNING

The possibility — however small — of anaphylactic reactions exists anytime your allergist injects allergenic proteins into your body. In some unfortunate cases, people have died after receiving their allergy shots. Therefore, although the odds of a serious reaction to allergy shots are far lower than those of getting into a bad car crash on the way to your allergist's office, take as many precautions as possible. After receiving an allergy shot, immediately tell your doctor or nurse if you're experiencing any of the following signs of serious adverse side effects:

- Itchiness of the feet, hands, groin area, or underarms
- Large-scale skin reactions, such as hives or *flushing* (sudden reddening of the face, neck, or upper chest)
- Upper and lower respiratory symptoms, such as sneezing, coughing, tightness of the chest, a swollen or itchy throat, itchy eyes, postnasal drip, difficulty swallowing, or a hoarse voice
- Nausea, diarrhea, or stomach cramps
- Dizziness, fainting, or a severe drop in blood pressure

AUTHOR SAYS

Because the threat of severe adverse reactions exists, we strongly advise against giving yourself allergy shots at home. Although practices vary in different areas, the vast majority of allergists insist that patients receive their allergy shots only in an appropriate medical facility because of this small chance of adverse, life-threatening reactions.

Looking at Other Forms of Immunotherapy

AUTHOR SAYS

New forms of immunotherapy are just around the corner. The most promising therapies include

- **Nasal sprays:** Nasal sprays that are under development may provide a less needle-dependent form of administering allergen extracts to patients.
- **Allergy drops:** This form of allergy treatment, a type of SLIT, is used in some European countries, mainly for dust mite and pollen allergies. The therapy involves holding drops of allergen extract under the tongue for as long as two minutes before swallowing. Although studies show that SLIT can be effective in reducing symptoms of certain pollen-triggered allergic reactions, patients

often need to hold as many as 20 drops (1 milliliter) under their tongue before swallowing, and that can be challenging for some people. And, unlike allergy shots, which usually require a visit to your doctor's office, SLIT is intended more as a self-administered therapy, meaning patients can take their doses at home. This raises issues of compliance, because patients may not always be able to adhere on their own to the proper way of taking these drops. Allergy drops are not FDA-approved and are considered off-label (being used in a way that's not described in the package insert) in the United States. Unfortunately, they aren't covered by health insurance plans, Medicare, or Medicaid. Speak with your allergist to determine the best treatment option for you to control your allergy symptoms.

- **Anti-IgE antibodies:** The agent in the medication Xolair is a high-tech antibody known as *recombinant human monoclonal antibody.* Researchers designed this drug to bind to the part of the IgE antibody that otherwise would bind with the IgE receptor site on mast cells, thus preventing the activation of these cells and subsequent allergic reaction (see Chapter 5 for more information about the immune system). This drug not only improves asthma, allergic rhinitis, and hives, but may also include the potential to block many types of allergic reactions that science hasn't had much success in controlling completely — for example, severe allergic food reactions during oral immunotherapy.

IN THIS CHAPTER

- Knowing what you're taking and why you're taking it
- Adhering to your asthma medication program
- Knowing the difference between preventive and rescue drugs
- Using and maintaining inhalers, holding chambers, and nebulizers

Chapter 12
Understanding Asthma Medications

Treatment with medications, which doctors refer to as *pharmacotherapy,* is a crucial component of your asthma management plan (see Chapter 4). As with the other aspects of your asthma management plan — self-monitoring (most commonly by using a peak-flow meter, as we explain in Chapter 5); keeping track of your symptoms (usually with a symptom diary; also see Chapter 5); avoiding possible asthma triggers (see Chapter 6); and educating yourself about your disease (this entire book) — adhering to your doctor's instructions for taking prescribed medications is vital in effectively treating your condition.

Given the choice, most people would rather not take medications on a regular basis. After all, you have places to go, people to meet, things to do. Remembering to inhale, swallow, or receive an injection of a prescribed medication at the right time in the proper manner can, every now and then, seem like a real nuisance.

Physicians who care for people with asthma are very aware that patients prefer not to take medications on a regular basis. However, asthma is more than the coughing, wheezing, or other respiratory symptoms you may occasionally experience. If you have persistent asthma — like the majority of asthmatics in the

United States — some degree of airway inflammation and *hyperreactivity* (increased sensitivity) is always present, even when you aren't noticing any obvious respiratory symptoms and therefore feel fine. Controlling that inflammation is the key to keeping your condition from getting out of hand.

As we explain in this chapter, for the vast majority of asthma patients, treatment with at least some form of controller (long-term) and/or rescue (short-term) medication is almost always an essential component of reducing the severity and frequency of your symptoms, and in some cases even eliminating them and improving your overall quality of life.

Understanding the Medicine You Take

An informed patient is a healthier person. In fact, making sure you understand all aspects of your treatment is your responsibility as a patient. Don't hesitate to inquire about medications your doctor prescribes for your asthma (or any ailment, for that matter). It's essential to know the following information about your prescription before you leave your doctor's office and begin using a medication:

- Note the name of the medication, the prescribed dose, how often you should take it, and over what period of time you must use it. Your doctor may provide an instruction card with this information. This card can greatly assist you in communicating with other doctors about the medications you're taking, and it may prove vital in an emergency situation. Likewise, ensuring that the product's name is clearly written is important because the drug and brand names of many medications sound alike.
- Be aware of the way the drug works, any potential adverse side effects that may result, and what you should do if any of these side effects occur.
- Be sure you know what you should do if you accidentally miss a dose or take an extra dose of the medication.
- Familiarize yourself with potential interactions between your prescription and other medications you already take or may take, including over-the-counter (OTC) antihistamines, decongestants, pain relievers, vitamins, or nutritional supplements.
- Understand any effects your prescription may have on various aspects of your life, such as your job, school, exercise or sports, other activities, sleeping patterns, and diet.
- If the medication is for your child, make sure you know how your child's dosage may differ from an adult's.

In addition, inform your doctor if either of the following situations applies to you:

- You're pregnant or nursing a child.
- You've had adverse reactions to any drugs in the past, including both prescription and OTC preparations.

Use only those products that are clearly identified to treat the symptoms you experience. Carefully read the product instructions and only take the medication according to your doctor's directions.

Occasionally, doctors need to prescribe medications *off-label* (beyond the manufacturer's official recommendations) in order to achieve maximum improvement in a particular patient's condition. A patient's health and well-being is a doctor's primary commitment, and sometimes treatments need to be individualized, such as using high-dose inhaled corticosteroids in cases of severe persistent asthma.

Taking Your Medicine: Why It's Essential

REMEMBER

Asthma is a chronic condition requiring chronic treatment. Therefore, you should treat your asthma the way people with high blood pressure or heart disease or diabetes treat their ailments: by taking medications preventively, on a regular basis. Most asthmatics get into trouble with their disease from too little rather than too much treatment. Patients who take their medications as directed can prevent the majority of emergency room visits and hospitalizations that asthma causes.

Your physician's goal is to determine the most appropriate medications to help you control your symptoms and achieve your best possible lung function without adverse side effects. You should routinely take the drugs your doctor prescribes because they're essential to managing your condition and they can help significantly improve your quality of life. If you don't use the medications your doctor prescribes, you're likely to have a much more difficult time controlling your asthma.

Looking at asthma's changing dynamics

Because asthma is a chronic disease, the vast majority of asthmatics need to take appropriate long-acting, preventive (controller) medications throughout their lifetime in order to control the underlying airway inflammation that characterizes this disease.

However, asthma is also a dynamic condition. As a result, the combination — and dosages — of medications your doctor prescribes for you may vary over time. Therefore, communicating with your physician's office about your medication regimen is vital. Even if your asthma seems stable and you're not experiencing noticeable respiratory symptoms, always check with your doctor before changing or stopping any medication.

In some cases, your physician may need to step up your medication to obtain better control of your symptoms, while in other instances, your doctor may recommend stepping down your level of medication if you've been able to consistently achieve good control of your symptoms. (See Chapter 5 for details on the stepwise approach to asthma management.)

Tracking your asthma condition

Because the frequency and character of your symptoms can change throughout your lifetime, your doctor needs to assess your condition on a regular basis, through lung-function tests (usually with spirometry) by monitoring fractional exhaled nitric oxide, a test that measures exhaled nitric oxide and indicates airway inflammation. Your peak expiratory flow rate, or PEFR (see Chapter 5), will also be evaluated. This enables your physician to determine whether your current treatment plan is optimal for your current condition, or if it requires adjustment.

Your asthma condition and severity level may change due to the following factors:

- Seasonal changes, especially those that involve sudden variations in climate and weather, as well as increases or decreases in pollen and mold counts
- Moving to a new building, neighborhood, city, or region, which can result in exposure to different types and levels of allergens and irritants
- Occupational changes, which may also expose you to different types and levels of allergens and irritants
- Changes in exercise and activity patterns
- Any change in medical condition, especially if it requires the use of a new medication that has the potential to cause an adverse drug interaction

Consult with your physician about any prescription or over-the-counter (OTC) medications you may already be taking or may think of taking for other medical conditions, even for relief of minor aches and pains. In some cases, adverse drug interactions can occur between these products and your prescribed asthma medications.

Regular medical visits also enable your doctor to evaluate your inhaler/nebulizer technique (see "Delivering Your Dose: Inhalers and Nebulizers," later in this chapter). Your doctor will want to make sure you are able to derive the maximum benefit from the medication administered by your delivery device.

REMEMBER

Effective asthma pharmacotherapy can help you achieve the following goals in managing your condition:

- Preventing and controlling your asthma symptoms
- Reducing the frequency and severity of your asthma episodes
- Reversing your airway obstruction and maintaining improved lung function

You can find more detailed information on the specific active ingredients and brand names of individual asthma drugs in the two chapters that follow this one. In Chapter 13, we get in depth with long-term (controller) drugs, while Chapter 14 focuses on quick-relief (rescue) products.

Getting the Long and Short of Asthma Medications

TECHNICAL STUFF

Asthma pharmacotherapy involves two basic classes of medications. These medications are

- **Long-term control medications:** Doctors prescribe these products as part of a regular preventive regimen (most often with daily doses) to achieve and control the underlying airway inflammation that characterizes asthma. For this reason, many of the products in this class are sometimes referred to as *anti-inflammatory drugs* or *controlling drugs*.
- **Quick-relief medications:** At times, you may need these products — often called *rescue drugs* or *relieving drugs* — to provide prompt relief of severe and sudden airway constriction and airflow obstruction that can occur when your asthma symptoms unexpectedly worsen.

Your doctor may prescribe products from both classes of medications as part of your long-term asthma management program. The specific combination your doctor prescribes depends on your asthma's severity and other factors, such as the following:

- **Your age:** Doses and products for infants, toddlers, children under 12, and older adults often vary from the doses and products doctors prescribe for children over 12 and adults. See Chapter 15 for more information about asthma and children and Chapter 17 for details about asthma and older patients.
- **Your medical history and physical condition:** For example, your doctor may adjust dosages and products if you're pregnant or nursing (as we explain in greater detail in Chapter 16).
- **Any other ailments that may affect you, as well as other medications you may take to treat those conditions:** Letting your doctor know about any and all medications you may be using (including OTC products for minor aches and pains, as well as vitamin supplements and herbal remedies) is essential to avoid potential adverse interactions between those products and the asthma medications your doctor may prescribe.
- **Any sensitivities you may have to particular drugs or to certain ingredients in the formulations of particular medications:** Some patients may experience tremors or jitteriness when using an older bronchodilator, such as albuterol (Proventil, Ventolin). However, these patients may experience fewer adverse side effects from a newer, improved broncholdilating formulation, such as levalbuterol (Xopenex), and will therefore be more likely to adhere to their asthma medication regimen.

Controlling asthma with long-term medications

If used in an appropriate, consistent manner, long-term control medications can reduce existing airway inflammation and may also help prevent further inflammation. However, your doctor should make sure you understand that these types of drugs aren't advisable for rescue relief of a severe asthma episode. For this reason, your asthma management plan should also include a prescribed quick-relief medication (most often a quick-relief bronchodilator, as we explain in "Relieving asthma episodes with quick-relief products," later in this chapter).

MYTH BUSTER

TONING YOUR LUNGS, NOT YOUR MUSCLES

The attempts by some athletes to build up muscle mass by abusing anabolic steroids (related to testosterone) have led many people to harbor negative perceptions about all steroids. Understanding that corticosteroids rarely, if ever, cause the adverse side effects often associated with inappropriate use of anabolic steroids is vital.

In fact, the corticosteroids in the inhaled and oral corticosteroid products often prescribed for asthma patients are a completely different type of drug than anabolic steroids, which are actually synthetic male hormones. The confusion is largely due to the common use of the term *steroid,* which is a general term for any of the hormones with related chemical structures produced by specific glands in the body. These hormones include testosterone from the *testes* (male reproductive glands), estrogen from the *ovaries* (female reproductive glands), and corticosteroids (related to *cortisone*) from the *cortex* (outer layer) of the *adrenal glands* (glands above the kidneys).

Most medical professionals consider *corticosteroid* — rather than *steroid* — the proper term for the types of inhaled and oral medications that are described in this chapter.

REMEMBER

Long-term control medications include the following categories of drugs:

- Anti-inflammatory drugs, such as inhaled corticosteroids (beclomethasone, budesonide, ciclesonide, flunisolide, fluticasone, mometasone), oral corticosteroids (methylprednisolone, prednisolone, prednisone), and inhaled mast cell stabilizers (cromolyn). These drugs are available in metered-dose inhaler (MDI), dry-powder inhaler (DPI), or compressor-driven nebulizer (CDN) formulations (see "Delivering Your Dose: Inhalers and Nebulizers," later in this chapter).
- Long-acting bronchodilators (LABAs), such as inhaled salmeterol and formoterol. Most LABAs require at least 10 to 30 minutes to begin providing relief and four to six hours to reach full effect.
- Long-acting muscarinic antagonists (LAMAs, such as Spiriva Respimat). These are bronchodilators for the long-term, once-daily maintenance treatment of asthma for patients 6 years of age and older. For example, Spiriva Respimat is given once per day.
- A combination of an inhaled corticosteroid with a LABA. These products, available under brand names such as Advair, Symbicort, and Dulera, treat both airway constriction and inflammation and are among the most commonly prescribed asthma controller medications in the United States. Trelegy combines an inhaled steroid with a LABA and LAMA.

- Leukotriene modifiers, such as oral montelukast (Singulair) and zileuton, available as tablets. If your physician decides that this category of drugs is suitable for your condition, you may benefit from the ease and convenience of taking tablets, which may help you more effectively adhere to the pharmacotherapy aspect of your asthma management plan. (The U.S. Food and Drug Administration [FDA] approved montelukast in pediatric formulations as chewable tablets and oral granules for young children and babies.)
- Anti-IgE antibodies, the first of the biologics to treat asthma. These drugs represent an exciting development in asthma treatment. Omalizumab (Xolair), which physicians administer by injection, is the first drug in this class to be approved by the FDA. (See Chapter 13 for a detailed discussion of IgE antibodies and the immune system.)
- Other biologics that target specific cells and pathways that cause allergic inflammation linked to asthma. These drugs, approved as add-on therapy for patients with severe asthma, include reslizumab (Cinquair), dupilumab (Dupixent), benralizumab (Fasenra), and tezepelumab (Tezspire).

Easing asthma episodes with quick-relief products

The primary function of quick-relief drugs, also known as *rescue medications*, is to promptly reverse acute airflow obstruction and relieve constricted airways during an asthma episode. Your doctor may also prescribe a quick-relief product, such as an inhaled beta$_2$-adrenergic bronchodilator, prior to exercise to prevent symptoms of exercise-induced asthma, or EIA.

REMEMBER

Quick-relief medications include

- **Short-acting beta$_2$-adrenergic bronchodilators:** These adrenaline-like drugs work by rapidly relaxing the smooth muscles in your airways, causing your airways to open, usually within five minutes of inhaling the medication. Inhaled or aerosol forms of these drugs provide the most effective, prompt relief of acute bronchospasms, and many doctors consider beta$_2$-adrenergic bronchodilators the medication of choice for treating asthma symptoms that suddenly worsen and for preventing EIA.

  Drugs in this class include albuterol (Ventolin HFA, ProAir HFA, ProAir RespiClick, ProAir Digihaler). A version (single isomer) of albuterol known as *levalbuterol* (Xopenex HFA), a short-acting beta$_2$-adrenergic bronchodilator, is available in CDN formulations for patients 6 and older.

- **Anticholinergics, which may provide added relief when combined with inhaled short-acting beta$_2$-adrenergic bronchodilators:** These drugs block *acetylcholine* (a neurotransmitter that stimulates mucus production) and therefore help reduce mucus in your airways. They also relax the smooth muscle around the lungs' large and medium airways. Ipratropium bromide (Atrovent HFA) is usually prescribed in combination with a short-acting beta$_2$-adrenergic bronchodilator to dilate your airways.
- **Oral corticosteroids, also referred to as systemic corticosteroids:** Doctors prescribe these for use in asthma attacks in addition to their use as long-acting medications. Your doctor may advise you to use oral corticosteroids during moderate-to-severe asthma episodes to rapidly gain control over worsening symptoms. In such cases, oral corticosteroids can help your other quick-relief medications work more effectively, resulting in a faster reversal or reduction of airway inflammation, speeding recovery, and reducing the rate of relapse.

  Because prolonged use of oral corticosteroids can lead to adverse systemic side effects, doctors typically prescribe these drugs only as a last resort and discontinue them (usually by gradual tapering) as soon as symptoms are under control.

WARNING

Introducing new rescue medication

The FDA approved a combination of albuterol and budesonide in an MDI called Airsupra as a rescue medication for asthma patients over 18 years of age. This rescue medication treats both airway constriction and inflammation. Because it contains albuterol, it has a faster onset of action than many other combination products and therefore provides quick emergency relief.

Taking asthma medications prior to surgery

WARNING

Anesthesia administered during surgery may depress lung function, so make sure your surgeon is aware of your asthma and the medications you take to control it. (Your surgeon should evaluate both your lung function and your medication use prior to surgery.)

Your doctor may prescribe a short course of oral corticosteroids to improve your lung function starting just prior to surgery. If you've taken oral corticosteroids within the six months prior to surgery, your doctor may also prescribe an intravenous corticosteroid on a set schedule during surgery, with a rapid taper of the dose within 24 hours after your procedure.

Delivering Your Dose: Inhalers and Nebulizers

Understanding how to use inhalers and nebulizers is an important aspect of effectively treating your asthma. If your medication doesn't go where it's supposed to go, you don't benefit from it. One of the unique aspects of treating a respiratory condition is that the proper use of an inhaler is just as important as the medication inside the inhaler: The objective is to get the medication to the area of your lungs where it can work most effectively.

REMEMBER

The major advantages of delivering drugs directly into your lungs with inhaled delivery systems include the following:

- You can more effectively administer higher concentrations of medication into your airways.
- You can reduce the risk of systemic side effects that may occur when you use oral forms of these medications.
- You receive relief from inhaled drugs faster than with oral products.

PROTECTING YOUR AIRWAYS AND THE OZONE

TECHNICAL STUFF

You're probably familiar with the issue of replacing ozone-depleting chlorofluorocarbons (CFCs) with less damaging propellants in refrigerators, air-conditioning systems, and aerosol sprays, particularly in hair, deodorant, and fragrance products. This issue especially affected people with asthma because many metered-dose inhaler (MDI) formulations used CFCs as propellants.

As a result, pharmaceutical companies developed more environmentally friendly propellants for MDI products. Hydrofluoroalkane (HFA), a nonchlorinated propellant, won FDA approval for use in inhaled medications. ProAir HFA (albuterol), Ventolin HFA (albuterol), and QVAR RediHaler (beclomethasone) were the first ozone-friendly products on the market with this propellant, which delivers medication to the lungs more effectively than the CFC propellants developed in the 1950s.

In most cases, because of a lower velocity propellant spray and smaller particle size, a non-CFC-propelled product allows more of the medication to get into the smaller, more peripheral airways of your lungs.

Using a metered-dose inhaler

TECHNICAL STUFF

An MDI consists of a canister of pressurized medication that fits into a plastic actuator sleeve and connects to a mouthpiece. An MDI propels medication at more than 60 miles per hour, and that medication needs to make a sharp turn to effectively get into the airways of your lungs. Therefore, most of the medication sprayed from the MDI never even reaches your lungs. For example, the spray can coat your mouth, the end of your tongue, or the back of your throat. In the best-case scenario, your small airways receive only 10 to 20 percent of the inhaled drug.

REMEMBER

Millions of people with asthma breathe easier thanks to inhalers, but properly using these devices is crucial to their success. Many people experience difficulty controlling their asthma because they use their inhalers incorrectly.

Taking your metered dose correctly

When prescribing your inhaled medication, your physician should instruct you on how to properly use an MDI. Likewise, they should review your inhaler technique at subsequent office visits. The following important instructions apply to most MDI products:

TIP

1. **Remove the cap and hold the encased inhaler upright.**
2. **Shake the inhaler.**
3. **Tilt your head back slightly and breathe out slowly.**
4. **Depending on your physician's specific instructions, open your mouth with your head 1 to 2 inches away from the inhaler or position the inhaler in your mouth.**
5. **Press down on the inhaler to release medication as you start inhaling or within the first second of inhaling; continue inhaling as you press down on your inhaler.**

   Breathe in slowly through your mouth, not your nose, for three to five seconds. Press your inhaler only once while you're inhaling (one breath for each inhalation). Make sure you breathe evenly and deeply.
6. **Hold your breath for ten seconds to allow the medicine to reach deep into your lungs.**
7. **Repeat inhalations as your prescription dictates.**

   Waiting one minute between inhalations may permit the second inhalation to reach into the airways of your lungs better.

Getting the right dose from your MDI

TIP

Two important factors that can affect the dosage you receive from your MDI include the following:

- **Loss of prime:** People who use inhalers often keep several around the house or office so that backup medication is always handy. Keeping too many backup inhalers around can lead to infrequent inhaler activation and *loss of prime.* Loss of prime occurs when the inhaler's propellant evaporates or escapes from the metering chamber after days or weeks of nonuse. If you haven't used an inhaler recently, waste a inhalation of medication (often less than a full dose) into the air before inhaling your first dose to ensure that you receive the full potency of your medication.
- **Tail-off:** In a misguided attempt to economize, many inhaler users try to squeeze every last drop of medication from their MDIs. However, research indicates that this practice may actually contribute to the documented rise in asthma-related deaths and poor quality of life for some people with asthma because of a phenomenon known as *tail-off.* As an MDI reaches its empty stage, dose reliability becomes increasingly unpredictable. Therefore, don't use your MDI beyond the labeled number of doses, even if you think some medication remains.

Using new, improved rescue inhalers versus generic brands

Many patients have found that ProAir RespiClick Inhalation Powder, which is formulated to deliver albuterol (a short-acting beta$_2$-adrenergic bronchodilator), is a simpler, user-friendly way of delivering medication to the airways compared to many other MDIs. That's mainly because the RespiClick eliminates the need for hand-breath coordination during inhalation. The RespiClick also doesn't require the use of a holding chamber or spacer (see the next section, "Using holding chambers").

The ProAir Digihaler Inhalation Powder, used in patients 4 years of age and older, is the only rescue inhaler with built-in sensors that can capture inhaler events so patterns of use can be recognized and shared with your doctor.

AUTHOR SAYS

Given the more sophisticated design and effectiveness of the RespiClick and other DPIs as well as the AirDuo Digihaler (which we discuss later in this chapter), you may wonder why generic MDIs continue to be prescribed.

The reason for that is simple: dollars and cents. A bottom-line attitude has taken over the healthcare industry, and too often, in the name of cost containment,

physicians prescribe low-cost generics rather than brand-name products. Many asthma patients may not be receiving the treatment they really require because their physicians prescribe generic medications rather than costlier brand-name products, such as the Digihaler, which feature more advanced drug formulations and easier-to-use inhalation systems.

Using a holding chamber

TECHNICAL STUFF

Doctors recommend *holding chambers* (also known as *spacers*) for younger children, as well as people who can't use an MDI correctly. A holding chamber is a hollow device that extends the space between the opening of the inhaler and your mouth. The holding chamber traps and suspends particles of medication as the inhaler releases them, allowing you to inhale your dose over a span of one to six breaths, depending on the particular device you use.

Use a holding chamber when taking inhaled corticosteroids with an MDI to minimize the possibility of developing an oral yeast infection and to improve delivery of the medication to your lungs.

TIP

Holding chambers come in various shapes and sizes. Several of these devices (such as AeroChamber and E-Z Spacer) have both a mouthpiece for adults, as shown in Figure 12-1, and a mask for infants and small children, as shown in Figure 12-2.

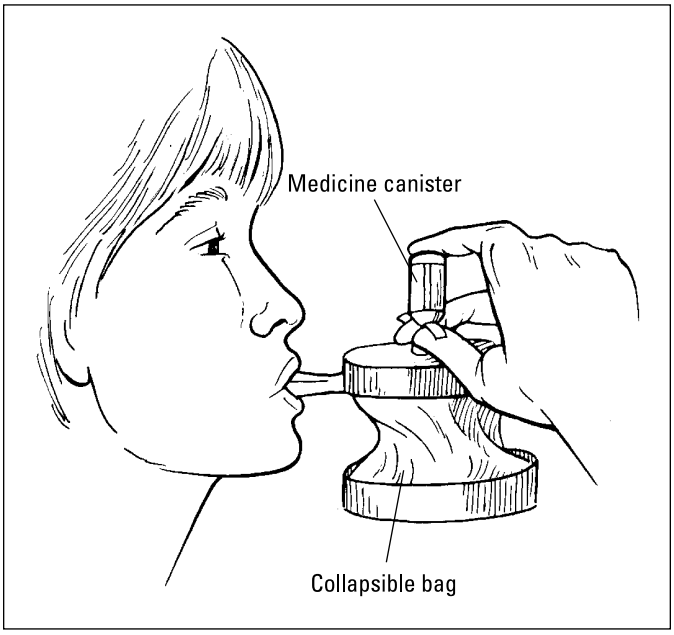


FIGURE 12-1: An adult using an MDI with a holding chamber and mouthpiece.

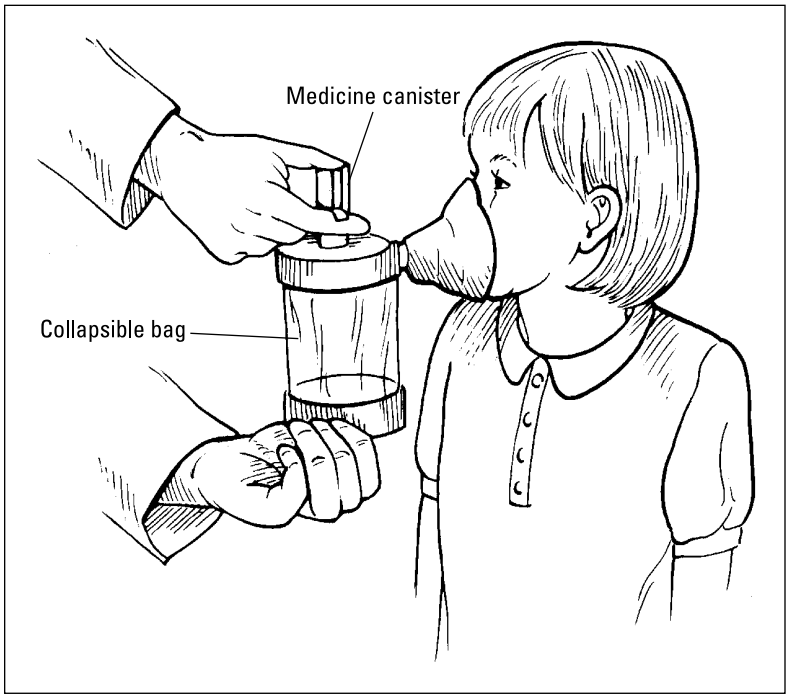


FIGURE 12-2: A child using an MDI with a holding chamber and mask.

Using a dry-powder inhaler

REMEMBER

DPIs, as their name implies, dispense medication in a dry-powder formulation. DPIs come in different shapes and sizes and can deliver bronchodilators as well as anti-inflammatory medications. The FDA has approved DPI formulations of the following long-acting drugs:

- Fluticasone, an inhaled corticosteroid available as ArmonAir Digihaler
- Mometasone, an inhaled corticosteroid available as Asmanex Twisthaler
- Fluticasone and salmeterol in combination, marketed as Advair Diskus, Wixela Inhub, AirDuo Digihaler, and AirDuo RespiClick

DPIs are easy to use and very effective if you operate them properly. The medication particles in the dry powder are so small that they can easily reach the tiniest airways. Keep in mind that, unlike most MDIs, with a few types of DPIs, you may not taste or feel the medication when using the device. If you've administered the medication properly, however, you will receive its benefit.

Some of the specific benefits of using a DPI include the following:

- Children as young as 4 can use these devices.
- For many people who have poor MDI technique or have difficulty coordinating the steps required for properly inhaling medication from an MDI, a DPI is often an excellent alternative, especially for children.
- One inhalation from a DPI often provides the same dosage as two inhalations of a comparable medication from an MDI.
- Because some DPIs have dose counters, you can easily tell when your inhaler is almost empty.
- Cold temperatures don't reduce the effectiveness of DPIs.
- DPIs don't use chlorofluorocarbons, so they don't damage the planet's ozone layer.

Taking your dry powder correctly

TECHNICAL STUFF

Although DPIs don't require the use of a holding chamber, you still need to operate your DPI in a specific way. Because every DPI works a little differently, make sure you know how to use the one your doctor prescribes. As with an MDI (see "Using a metered-dose inhaler"), your physician should instruct you how to properly use your DPI and should review your inhaler technique at subsequent office visits.

The following are important general instructions on the proper use of most DPIs:

1. **Follow the manufacturer's instructions to prime your DPI and then load a prescribed dose of the dry-powder medication.**
2. **Breathe out slowly and completely (usually for three to five seconds).**
3. **Put your mouth on the mouthpiece and inhale deeply and forcefully.**
4. **Hold your breath for ten seconds and then exhale slowly.**
5. **Repeat the procedure as outlined by your physician until you've taken the correct number of doses.**

Getting the right dose from your DPI

TIP

To obtain the most benefit from your DPI, keep the following points in mind:

- **Your DPI is breath-activated.** That means you can control the rate at which you inhale the dry powder. However, you do need to inhale with sufficient

force (minimal flow rate) to ensure delivery of the medication to the smallest airways of your lungs. To get the full benefit of using a DPI, close your mouth tightly around the inhaler's mouthpiece and inhale steadily, deeply, and forcefully.

- **Make sure the dry powder in your DPI stays dry to prevent caking or clumping, which can affect the dose's reliability.** For DPIs with caps, make sure you always replace the cap after using the product. Don't ever wash a DPI that still contains medication.
- **In contrast with an MDI, you don't need to shake your DPI just before using it to ensure delivery of the proper dose.** In fact, shaking some DPIs can result in losing dry powder.

Using a multidose dry-powder inhaler

Advair is one of the FDA-approved combinations of fluticasone (an inhaled corticosteroid) and salmeterol (a long-acting beta$_2$-adrenergic bronchodilator). This medication is formulated in a delivery device known as a *Diskus*. As with other DPIs, the Diskus is breath-activated, and for the majority of patients, it's easier to use than most MDIs.

The FDA approved this product to treat both the underlying inflammation that characterizes asthma and the airway constriction that often results from episodes of respiratory symptoms. Evidence suggests that using Advair Diskus usually reduces airway inflammation within one or two weeks (sometimes longer in certain cases), while the medication's bronchodilation effects are usually felt within 30 to 60 minutes. However, remember that Advair Diskus isn't a replacement for a quick-relief drug that your doctor prescribes for you to use if your respiratory symptoms worsen.

Important advantages of Advair Diskus include the following:

- Each dose of Advair is effective for up to 12 hours. The normal dosage is one inhalation twice per day (for patients 12 and older): once in the morning and once at night. This medication schedule is often more practical for patients than most MDI medications. As a result, patients using Advair Diskus are likely to be more successful in adhering to an asthma management plan.
- Using the Diskus requires far less coordination than most MDIs.
- The built-in Diskus dose counter lets you keep track of every dose.

Operating your Diskus

If your physician prescribes Advair Diskus for you, make sure they explain the proper use of the device.

TIP

The following are important general instructions for using the Diskus:

1. **While holding the device in one hand, place the thumb of your other hand on the device's thumb grip and push away until the mouthpiece appears and snaps into position.**
2. **Hold the Diskus in a level horizontal position with the mouthpiece facing you and slide the lever away from you as far as it goes until it clicks.**

   The click means the Diskus is ready for use.
3. **Exhale while holding the Diskus level but away from your mouth (never exhale into the Diskus mouthpiece).**
4. **Placing the mouthpiece to your lips, breathe in quickly and deeply through the Diskus (don't breathe in through your nose).**
5. **Remove the Diskus from your mouth and hold your breath for about ten seconds or as long you find comfortable; exhale slowly through your mouth.**
6. **Close the Diskus when you have finished taking a dose.**

   To do so, place your thumb once again on the thumb grip and slide it back toward you as far as it goes. The Diskus clicks shut, and the lever returns to its original position. The device is ready for your next dose, which you should take in approximately 12 hours (unless your doctor has advised you differently).
7. **After taking your Diskus dose, rinse your mouth with water without swallowing.**

Getting the right dose from your Diskus

TIP

Beyond the general Advair Diskus instructions listed in the previous section, keep the following points in mind to get the most out of this medication:

- Don't advance the lever more than once when preparing your dose. Also, don't play with the lever.
- Avoid tilting the Diskus when using it. Only use it in a level horizontal position.
- Never try to take the Diskus apart.
- Always keep the Diskus dry. Never wash any part of the device, including the mouthpiece.

Slow-moving mist inhalers

Aerosols delivered by Respimat Soft Mist Inhaler are slower-moving and longer-lasting, and the device generates smaller particle sizes than those from MDIs, improving the efficiency of pulmonary medication delivery to the lungs.

The LAMA tiotropium bromide (Spiriva Respimat) is available in a soft mist. The spray is designed to be easier to inhale than inhalations from an MDI, but the inhalation technique is similar to the MDI.

Using a nebulizer

A *nebulizer* is an air compressor connected to a generator. By transforming liquid formulations and suspensions into medical aerosol, nebulizers improve drug delivery to patients with respiratory diseases such as asthma. Sometimes known as "breathing machines," they are particularly useful when a child is too young or too sick to use other devices. In addition, you can purchase portable nebulizers with battery packs for use when traveling.

Three categories of nebulizers are available: jet nebulizers, ultrasonic nebulizers, and mesh nebulizers. Each has certain advantages and disadvantages:

- Jet nebulizers (compressor-driven nebulizers or CDN) use compressed gas to make an aerosol (tiny particles of medication in the air). These types of nebulizers are the ones most commonly used for delivery of frequently prescribed inhaled asthma drugs such as albuterol and corticosteroids. They are relatively inexpensive and easy to use. However, they can be heavy, bulky, noisy, and difficult to clean, and they need compressed gas and additional tubing.
- Ultrasonic nebulizers make an aerosol through high-frequency vibrations. These nebulizers are more efficient and compact than jet nebulizers for delivering albuterol but cannot be used to deliver suspensions such as inhaled nebulizer corticosteroids (budesonide).
- Recently developed mesh nebulizers work by passing liquid through a very fine mesh to form an aerosol. These devices are more efficient than other nebulizers, provide increased portability with a self-contained power source, and are fast, quiet, and easy to use. The main disadvantages of mesh nebulizers are that they are more expensive than other devices, and some models are available only for specific drugs.

Doctors typically recommend jet nebulizers as the delivery device for administering albuterol (bronchodilator) or budesonide (inhaled corticosteroid).

SEE YOUR DOCTOR

Doctors may prescribe nebulizer therapy for adults to reduce or eliminate hospital or emergency room visits, especially for severe persistent asthma sufferers. Many nebulizer users find the device allows them more effective relief than MDIs. Therefore, if you're experiencing frequent sudden-onset, severe asthma attacks, you may benefit greatly from having a nebulizer prescribed for home use.

TIP

Remember these general guidelines when using a nebulizer with a mouthpiece:

- Place your mouth over the mouthpiece and breathe in and out.
- Make sure you breathe through your mouth and not your nose.
- You can use a face mask that covers the mouth and nose with the nebulizer. Some nebulizer manufacturers also offer colorful kid-friendly pediatric masks. These masks usually feature animal shapes and can make the process of using a nebulizer more attractive — even fun in some cases — for young children.
- Have an extra nebulizer mask on hand when using the device, especially if you're administering the medication to a young child. (If you have a young child, you can probably imagine any number of reasons why that extra mask may come in handy.)

WARNING

- When using a nebulizer on your child, don't blow or mist the medication in their face. A nebulizer requires a closed system to provide effective treatment (we explain this aspect in greater detail in Chapter 15).
- Use all the medication in your nebulizer. (Doing so normally takes 7 to 15 minutes, depending on the type of nebulizer you're using.)

Cleaning your medication delivery system

Rinse your MDI, holding chamber, and nebulizer daily and wash these devices weekly with a mild detergent to keep them clean and free of medication buildup. Don't use harsh chemicals when washing your delivery devices, and make sure to follow the manufacturer's instructions for maintenance and care. Don't forget any MDIs that have been sitting in a drawer, backpack, briefcase, or handbag for a long time. Remember to always keep the cap on your MDI when you're not using it. If the cap accidentally becomes dislodged, make sure you properly clean your inhaler before using it again.

WARNING

However, when cleaning a DPI, wipe the mouthpiece with a clean dry cloth at least once per week. Don't rinse the device with water because the powder in a DPI is sensitive to moisture.

IN THIS CHAPTER

- Controlling your asthma with long-term drugs
- Understanding why anti-inflammatory products are often vital for asthma patients
- Combining certain types of drugs for optimal long-term asthma control
- Introducing biologics, the new asthma therapy on the block

Chapter 13

Looking at Asthma Controller Drugs

Asthma is more than coughing, wheezing, shortness of breath, chest tightness, and other respiratory symptoms that may come and go. If you have persistent asthma, as is the case for a majority of people with asthma, some airway inflammation and *hyperreactivity* (twitchiness) will almost always be present throughout your lifetime, even during periods when you aren't experiencing obvious symptoms.

As a result, an essential aspect of treating asthma is the regular preventive use of long-term control medications, also known as *anti-inflammatory drugs* or *controller drugs*, which your physician prescribes to control your airway inflammation. Along with these products, your doctor should prescribe quick-relief medications (often called *rescue drugs* or *relieving drugs*) — such as short-acting bronchodilators — to be used appropriately on an as-needed basis during an asthma episode and prior to allergen exposure or exercise. (See Chapter 14 for more on rescue drugs.)

Your doctor usually prescribes medications from at least one or more of the following classes of drugs as part of your long-term asthma management plan:

- Anti-inflammatories, which include inhaled corticosteroids, oral corticosteroids, and mast cell stabilizers
- Long-acting bronchodilators
- Leukotriene modifiers
- Biologics for asthma

We discuss each of these categories of long-term asthma medications extensively throughout this chapter and provide general dosage information for specific drugs.

Controlling Airway Inflammation with Corticosteroids

Corticosteroids provide the most potent and consistently effective long-term control of moderate to severe symptoms of asthma. With their anti-inflammatory action, these drugs can

- Decrease swelling in your airways
- Make your airways less hyperresponsive (twitchy) to asthma triggers
- Reduce mucus production in your airways

Corticosteroids may also prevent irreversible damage known as *remodeling* (replacing healthy tissue with scar tissue) to the airway (see Chapter 1).

Inhaled corticosteroids

Doctors generally consider inhaled corticosteroids the primary *controller therapy* or *maintenance therapy* for patients with moderate or severe persistent asthma because of the drugs' anti-inflammatory properties. Doctors use these drugs because the inhaled forms directly deliver the medication to the airways with minimal side effects (see Table 13-1). Consistent and appropriate (as determined by your doctor) use of inhaled corticosteroids can also reduce the need for oral (or *systemic*) corticosteroids, which may cause serious adverse side effects when used long term.

Inhaled corticosteroids usually start reducing airway inflammation after a week of regular use, reaching their full effect within four weeks. However, although these drugs can work well as preventatives, if you develop severe symptoms — from a sudden high exposure to potent asthma triggers, for example — you need to use a quick-relief medication (usually a bronchodilator your doctor prescribes) as part of your asthma management plan.

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

TABLE 13-1 Inhaled Corticosteroid Medications

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose	Total Usual Daily Adult Dose
Beclomethasone	MDI (HFA P&B): 40 mcg or 80 mcg	QVAR-Digihaler QVAR RediHaler	(Ages 6–17) Low dose 1–2 inhalations of 40 mcg twice per day Medium dose 1–2 inhalations of 80 mcg twice per day	(Ages 18 and older) Low dose: 1 inhalation of 40 mcg or 80 mcg twice per day Med. dose: 2 inhalations twice per day High dose: 4 inhalations of 80 mcg twice per day
Budesonide	Respules (CDN): 0.25 mg, 0.5 mg, 1.0 mg per 2 mL unit dose	Pulmicort Respules	(Ages 12 months–8 years) CDN Initial dose: 0.5 mg, starting as single dose, or 0.25 mg twice per day, not to exceed 1 mg High dose (for patients on oral corticosteroids who need to convert to inhaled corticosteroids):Total of 1 mg per day	CDN: Low dose: 0.5 mg once per day Med. dose: 0.5 mg twice per day High dose: 0.5 mg twice per day or 1 mg once per day
Budesonide with formoterol	MDI (HFA): 80/4.5 mcg (pediatric formulation) 160/4.5 mcg (ages 12 and older)	Symbicort	(Ages 6–11) Two inhalations of the 80/4.5 mcg formulation twice per day	1–2 inhalations of the 160/4.5 mcg formulation twice per day

(continued)

TABLE 13-1 ***(continued)***

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose	Total Usual Daily Adult Dose
Budesonide with albuterol	MDI (HFA): 80 mcg budesonide 90 mcg albuterol	Airsupra	(Ages 18 and older)	2 inhalations for as-needed treatment. Not more than 6 doses per 24 hours
Ciclesonide	MDI (HFA): 40 mcg (pediatric formulation) 80 mcg/inhalation 160 mcg/inhalation	Alvesco	(Ages 6–11) 2 inhalations of 40 mcg once per day	Low dose: 2 inhalations of 80 mcg once per day High dose: 2 inhalations of 160 mcg once per day
Fluticasone	Flovent MDI (HFA): 44, 110, 220 mcg/inhalation	Flovent ArmonAir Digihaler DPI (ages 12 and older)	(Ages 4–11; Flovent only) MDI: 1–2 inhalations of 44 mcg twice per day DPI: 1–2 inhalations of 50 mcg twice per day	MDI (twice per day): Low dose: 2–6 inhalations of 44 mcg (Flovent), 55 mcg (ArmonAir) or 2 inhalations of 110 mcg (Flovent), 113 mcg (ArmonAir) twice per day Med. dose: 2–6 inhalations of 110 (113 mcg ArmonAir) mcg twice per day High dose: 6 inhalations of 110 (113) mcg or 3 inhalations of 220 mcg (233 mcg) twice per day DPI (twice per day): Low dose: 2–6 inhalations of 50 mcg (55 mcg) twice per day Med. dose: 3–6 inhalations of 100 mcg (113 mcg) twice per day High dose: 6 inhalations of 100 mcg (113 mcg) or 2 inhalations of 250 mcg (233 mcg) twice per day

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose	Total Usual Daily Adult Dose
Fluticasone	DPI: 50, 100, 200 mcg/dose	Arnuity Ellipta	(Ages 5–11) 1 inhalation of 50 mcg once per day	1 inhalation of 100 or 200 mcg once per day
Fluticasone with salmeterol	Diskus (DPI) in 3 formulations: 100, 250, or 500 mcg fluticasone with 50 mcg salmeterol MDI (HFA) in 3 formulations: 45, 115, 230 mcg with 21 mcg salmeterol 55, 113, 232 mcg with 14 mcg salmeterol	Advair Diskus, Advair HFA, AirDuo RespiClickDPI, AirDuo Digihaler DPI	(Ages 4 and older) 1 inhalation twice per day	(Ages 12 and older) 1–2 inhalations twice per day (Ages 12 and older) 1–2 inhalations twice per day
Fluticasone with vilanterol	DPI: 50, 100, 200 mcg fluticasone with 25 mcg vilanterol	Breo Ellipta	(Ages 5–11) 1 inhalation of 50 mcg/25 mcg once per day (Ages 12–17) 1 inhalation of 100 mcg/25 mcg once per day	Low dose: 1 inhalation of 100 mcg/25 mcg once per day High dose: 1 inhalation of 200 mcg/25 mcg once per day
Fluticasone with umeclidinium and vilanterol	DPI: 100, 200 mcg fluticasone with 62.5 mcg umeclidinium and 25 mcg vilanterol	Trelegy Ellipta	(Ages 18 and older)	1 inhalation once per day for both formulations
Mometasone	Twisthaler (DPI): 110, 220 mcg MDI HFA Aerosol: 50, 100, 200 mcg	Asmanex	(Ages 4–11) 1 inhalation of 110 mcg once per day (Ages 5–11) 2 inhalations of 50 mcg twice per day	(Ages 12 and older) 1 to 2 inhalations of 220 mcg once or twice per day (Ages 12 and older) 2 inhalations of 100 or 200 mcg twice per day
Mometasone with formoterol	MDI (HFA): 50, 100, 200 mcg of mometasone with 5 mcg formoterol	Dulera	(Ages 5–11) 2 inhalations of 50 mcg/5 mcg twice per day	(Ages 12 and older) 2 inhalations of 100 or 200 mcg/5 mcg twice per day

Note: mcg = microgram; mg = milligram; mL = milliliter; CDN: compressor-driven nebulizer; MDI: metered-dose inhaler; DPI: dry-powder inhaler; HFA: hydrofluoroalkane; P & B: press and breathe.

Knowing your inhaled corticosteroid devices and formulations

Doctors can prescribe inhaled corticosteroids in metered-dose inhaler (MDI), dry-powder inhaler (DPI), or compressor-driven nebulizer (CDN) formulations (see Chapter 12).

WARNING

Because the pressurized canisters of some MDI medications are packaged in plastic sleeves of the same color, knowing which strength your doctor specifically prescribes for you is especially important.

Monitoring children who take inhaled corticosteroids

SEE YOUR DOCTOR

Although all available evidence indicates that inhaled corticosteroids are highly effective and safe for children, some concern exists about the possible temporary effects on the growth rate in children who use these products.

If your child's asthma doctor prescribes inhaled corticosteroids, make sure they accurately monitor your child's growth.

Taking inhaled corticosteroids more effectively

TIP

To avoid the rare occurrence of an oral yeast infection or hoarseness (due to yeast infection in the throat) from using inhaled corticosteroids, make sure you thoroughly rinse your mouth with water, or even a mouthwash, without swallowing, after using any of these products.

Use a holding chamber, sometimes known as a spacer (see Chapter 12 for more information), with an MDI formulation of inhaled corticosteroids to improve delivery of the medication to the airways and further reduce the risk of developing an oral yeast infection or hoarseness of the throat.

Oral corticosteroids

In severe asthma cases, early use of oral corticosteroids can prevent relapses and reduce the need for hospitalization. They're also essential for treating patients who don't respond quickly to bronchodilators (see Table 13-2). In addition, doctors may use oral corticosteroids to gain prompt control of asthma when starting long-term therapy.

WARNING

If overused, these drugs can cause systemic adverse side effects, including fluid retention, altered blood sugar levels, weight gain, peptic ulcers, mood alteration, high blood pressure, reduced bone density, and impaired immune functioning. For this reason, oral corticosteroids are often the last medications doctors add to your pharmacotherapy and the first ones they remove — after they determine that your symptoms are under control.

If you suffer from severe persistent asthma, your doctor may prescribe a course of alternate-day, single morning (one dose in the morning) oral corticosteroid therapy to control symptoms while reducing the risk of adverse side effects.

SEE YOUR DOCTOR

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

For all the medications in Table 13-2, the following dosages are recommended:

- **For children younger than 12:** 0.25 to 2 mg per kg of the child's weight in a single daily dose or single dose every other day as needed for control of symptoms. Doctors may also prescribe a short course "burst" of 1 to 2 mg per kg of the child's weight per day, for a maximum of 60 mg per day, for 3 to 10 days.
- **For children 12 and older and adults:** 7.5 to 60 mg in a single daily dose or single dose every other day as needed for control of symptoms. Doctors may also prescribe a short course "burst" of 40 to 60 mg per day as a single dose or 2 divided doses for 3 to 10 days.

TABLE 13-2 Oral Corticosteroid Medications

Active Ingredient	Formulation	Brand Name
Methylprednisolone	2, 4, 8, 16, 32 mg tablets	Medrol
Prednisolone	15 mg/5 mL solution	Orapred
Prednisolone	5 mg tablets	Omnipred
Prednisolone	15mg/5mL solution	Prelone
Prednisolone	5 mg/5mL solution	Pediapred
Prednisone	1, 2.5, 5, 10, 20, 25 mg tablets	Deltasone

Note: 1 kg (kilogram) = 2.2 pounds; mg = milligram; mL = milliliter.

Preventing Respiratory Symptoms with Mast Cell Stabilizers

TECHNICAL STUFF

Mast cells are important players in the inflammatory process. These cells exist in large numbers in your lungs and nose. When triggered (usually by allergens), mast cells release several substances, including histamine and leukotrienes, which cause inflammation and lead to airway constriction and increased mucus production.

Mast cell stabilizers used in long-term treatment of asthma, such as inhaled cromolyn, inhibit the release of mast cell mediators (chemical substances that take an active part in the development of the inflammatory response) thus preventing or reducing inflammation. (See Chapter 1 for an explanation of airway inflammation.) However, to properly prevent asthma symptoms, cromolyn needs to be used on a regular basis with proper inhalation technique.

Cromolyn is administered as Intal nebulizer solution and is supplied as a 20 mg vial of solution. The recommended dosage in compressor-driven nebulizer formulation for pediatric patients (children over two years of age) and adult patients is one ampule four times per day or as needed prior to exercise or allergen exposure.

SEE YOUR DOCTOR

The names, formulations, and doses in the above paragraph are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

Cromolyn

For some patients, cromolyn can be effective, either alone or with a bronchodilator, in preventing the symptoms of persistent mild-to-moderate asthma. Doctors sometimes recommend cromolyn in a nasal formulation (NasalCrom), available as an over-the-counter product, to prevent *allergic rhinitis* (hay fever) symptoms (see Chapter 10).

Your doctor may also prescribe cromolyn medications for asthma treatments in CDN or MDI forms.

Prescribing cromolyn for young children

REMEMBER

Because cromolyn has an excellent safety profile and produces no significant side effects, doctors sometimes use it in CDN form to treat young children (see Chapter 15).

Cromolyn especially helps suppress symptoms brought on by unavoidable exposures to asthma triggers such as animal dander, pollen, and viral respiratory infections. Your doctor may prescribe this drug during pollen season or winter months or if you experience routine exposures to pets.

Taking cromolyn prior to pollen exposure and exercise

TIP

To prevent pollen-induced symptoms, start taking inhaled cromolyn at least one week before pollen season begins. Taking inhaled cromolyn 30 minutes before exposure to animal dander — during (preferably) brief visits with people who have pets, for example — can often reduce the risk of developing asthma symptoms.

Cromolyn can prevent or reduce exercise-induced asthma (EIA) symptoms if you take it 15 to 30 minutes before exercising. (We discuss exercise-related respiratory symptoms in Chapter 9.)

Knowing when mast cell stabilizers may not be enough

REMEMBER

Although appropriate long-term, routine use of cromolyn can reduce the intensity of your asthma symptoms, this drug is not helpful in managing an asthma episode if one occurs. If you suffer an asthma attack, you may need to use a short-term rescue bronchodilator as your asthma management plan specifies. However, your doctor may advise you to continue using cromolyn even during an asthma episode to maintain the drug's preventive effect, in addition to any other prescribed treatment.

Dilating Your Airways with Long-Acting Bronchodilators

REMEMBER

Doctors prescribe long-acting bronchodilators (LABAs) for long-term prevention of asthma symptoms, usually with anti-inflammatory medications such as inhaled corticosteroids. LABAs are not given alone because they have been known to worsen asthma when prescribed as a single agent. In addition to relaxing your airway's smooth muscles, LABAs can increase the anti-inflammatory effect of inhaled corticosteroids if you use them on a consistent long-term basis.

Because long-acting bronchodilators can dilate the airways for up to 12 hours per dose, doctors often prescribe these products in combination with inhaled corticosteroids to control nighttime asthma symptoms (see Table 13-3). This combination works well to prevent episodes of nighttime asthma and EIA, if taken 30 minutes before exercising, while enhancing the effect of inhaled corticosteroids when used together.

WARNING

LABAs are not recommended to be used as single agents because studies have shown that when given alone without being combined with inhaled corticosteroids, LABAs have been known to worsen asthma symptoms.

SEE YOUR DOCTOR

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

TABLE 13-3 Long-Acting Beta Bronchodilators (LABAs)

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose (Under 12)	Total Usual Daily Adult Dose
Albuterol (sustained release tablet)	4 or 8 mg extended-release tablets	Volmax, Proventil Repetab	(Ages 6–11) 0.3 to 0.6 mg per kg of child's weight, not to exceed 8 mg total per day	1 tablet (4 or 8 mg) twice per day, not to exceed 32 mg total per day
Formoterol	Used only in combination with inhaled corticosteroid	Symbicort, Dulera	See Table 13-1 for inhaled corticosteroid medications	See Table 13-1 for inhaled corticosteroid medications
Salmeterol	Diskus (DPI): 50 mcg/inhalation MDI: 21 mcg/inhalation Used only in combination with inhaled corticosteroid	Advair Diskus, Advair HFA, AirDuo RespiClick, AirDuo Digihaler, Wixela Inhub	(Ages 4–11) DPI: 1 inhalation twice per day MDI: Not approved for children under 12	DPI: 1 inhalation twice per day MDI: 2 inhalations twice per day
Vilanterol	Used only in combination with inhaled corticosteroid	Breo Ellipta, Trelegy Ellipta	See Table 13-1 for inhaled corticosteroid medications	See Table 13-1 for inhaled corticosteroid medications

Note: 1 kg (kilogram) = 2.2 pounds; mcg = microgram; mg = milligram; DPI: dry-powder inhaler; HFA: hydrofluoroalkane; MDI: metered-dose inhaler.

Combining two drugs: Inhaled corticosteroids and LABAs

The introduction of a combination of an inhaled corticosteroid (fluticasone, mometasone, budesonide) and a long-acting beta$_2$-adrenergic bronchodilator (salmeterol, formoterol) represents a *complementary* (an enhanced anti-inflammatory effect compared to either therapy alone) blend of medications.

According to studies of patients with persistent asthma who were previously treated with inhaled corticosteroids, Advair (available in a Diskus DPI device) improved lung function by 25 percent on average compared to 15 percent improvement with fluticasone alone and 5 percent with salmeterol alone.

Researchers have found that taking one dose of Advair is superior to taking two separate doses of fluticasone and salmeterol at the same time. Advair represents a significantly more convenient and effective form of combination asthma therapy that treats airway constriction and inflammation, which probably explains why Advair and other combination medications have become the most commonly prescribed asthma medications in the United States.

Understanding timing: Why long-acting products may not always be enough

Effectively using these long-acting products may also reduce your need for quick-relief bronchodilators. However, long-acting bronchodilators combined with an inhaled corticosteroid, such as salmeterol with fluticasone (Advair), take longer to kick in (ranging from 10 to 30 minutes and reaching peak effectiveness in 4 to 6 hours) and don't work as well as rescue medications if asthma episodes develop.

Currently, the only long-acting bronchodilator with a rapid onset of action in the United States is formoterol. Available in combination formulations (Symbicort, Dulera), this drug starts working in most patients within one to three minutes.

If you experience an asthma attack, continue using the quick-relief medication your doctor prescribes. If you have a heart condition, make sure your doctor knows this before prescribing long-acting beta$_2$-adrenergic bronchodilators. In some cases, these products can cause an elevated heartbeat.

Enhancing anti-inflammatory effectiveness

Never consider long-acting beta$_2$-adrenergic bronchodilators a substitute for anti-inflammatory medication, such as inhaled corticosteroids. Using long-acting bronchodilators with inhaled corticosteroids enables you to reduce your inhaled corticosteroid dose, while maintaining equal or better control of your asthma. Studies provide strong evidence that adding a long-acting bronchodilator to your pharmacotherapy enhances the effectiveness of your existing inhaled corticosteroid medication.

Long-acting muscarinic antagonists (LAMAs) are medications that help control asthma on a long-term basis. These medications improve lung function, reduce exacerbations and improve asthma control when added to inhaled corticosteroids plus a long-acting beta agonist (LABA) in patients with moderate to severe uncontrolled asthma.

At present, four LAMAs are approved for treatment of COPD, but only one of these, tiotropium, is currently approved for use in treating asthma. That medication is available under the brand name Spiriva Respimat Inhalation Spray and contains 1.25 mcg per inhalation. The dosage per patients six years of age or older is two inhalations once per day.

The names, formulations, and doses listed are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

Reducing Respiratory Symptoms with Leukotriene Modifiers

Leukotrienes are chemicals that constrict the bronchial tubes, cause mucus secretion, and produce other adverse effects characteristic of asthma (see "Understanding the importance of leukotrienes in asthma," later in the chapter). *Leukotriene modifiers* are a class of drugs that prevent the activity of leukotrienes (montelukast) or block their production (zileuton). Regular use of these drugs can, in some asthma patients, substantially reduce respiratory symptoms.

Leukotriene modifiers can begin to work within an hour. However, these drugs often require a few days to a week of regular use to reach their full effect. Some asthmatics who have taken leukotriene modifiers over an extended period have reduced the amount of long-term inhaled corticosteroids or other inhaled medications needed to control their asthma symptoms.

In the United States, leukotriene modifiers available by prescription in tablet form for the long-term management of asthma (see Table 13-4) include montelukast (Singulair) and zileuton (Zyflo). The FDA (Food and Drug Administration) also approved montelukast for allergic rhinitis (see Chapter 10), and this drug shows promise in treating allergic conjunctivitis as well.

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

TABLE 13-4 Leukotriene Modifiers

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose	Total Usual Daily Adult Dose
Montelukast	10 mg tablet; 5 mg chewable tablet; 4 mg chewable tablet; 4 mg oral granules	Singulair	(Ages 6–14) One 5 mg chewable tablet per day (in the evening) (Ages 2–5) One 4 mg chewable tablet per day (in the evening) (Ages 12–23 months) One packet of 4 mg oral granules per day (in the evening); can be administered directly into the baby's mouth or mixed with soft food (applesauce, carrots, rice, or ice cream are recommended)	One 10 mg tablet per day (in the evening)
Zileuton	600 mg tablet 600 mg extended release	Zyflo	Not approved for children under 12	2400 mg daily: 600 mg tablet four times per day or 1200 mg twice per day

Note: mg = milligram

Compared with other categories of asthma drugs, some patients find leukotriene modifiers more user-friendly, because they're formulated as tablets and oral granules. As a result, you may find taking these medications on a regular basis more convenient than other products. That should mean you'll be more likely to successfully adhere to your asthma management program.

WARNING

Leukotriene modifiers aren't rescue medications. If you suffer an asthma attack, use a quick-relief bronchodilator as your asthma management plan specifies. However, continue taking your prescribed leukotriene modifiers during your asthma episode, because the drug often enhances the effectiveness of quick-relief medications.

Understanding the importance of leukotrienes in asthma

Leukotrienes are potent biochemical substances that play a significant role in asthma attacks. These chemical mediators of inflammation are stored in special immune system cells known as *mast cells*. They're released when you're exposed to allergy and asthma triggers and precipitating factors. (See Chapter 6 for details on the various factors that can trigger your respiratory symptoms.)

TECHNICAL STUFF

After they're released, leukotrienes induce inflammation, increase mucus secretions, attract and activate inflammatory cells in your airway, and promote the production of immunoglobulin E (IgE) antibodies, thus playing an active role in both allergic reactions and asthma episodes. (We discuss leukotrienes and other chemical mediators of inflammation more extensively in Chapter 11.)

Watching out for adverse side effects

WARNING

Leukotriene modifiers can sometimes reduce respiratory reactions in patients with sensitivities to aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs). If you suffer from these types of sensitivities, however, continue avoiding aspirin and NSAIDs while taking leukotriene modifiers because reactions still may occur.

Reactions to newer NSAIDs

Although studies have shown that the newer prescription NSAIDs, known as COX-2 inhibitors, such as celecoxib (Celebrex), appear not to trigger the same types of reactions in susceptible individuals as the older NSAIDs, the patient inserts for these newer medications still warn about the possibility of adverse reactions. So, we're echoing that warning here. Avoidance (see Chapter 7) is still the best approach when dealing with any type of drug sensitivity.

Neuropsychiatric effects

In 2007, the FDA required a black box warning (the highest safety warning) for montelukast (Singulair) describing serious mental health side effects, including aggression, depression, agitation, sleep disturbances, and suicidal thinking. If you notice any significant sleep or mood disturbances while taking Singulair, speak with your doctor about changing your medication.

Looking at leukotriene modifiers, adverse interactions, and your liver

Because certain leukotriene modifiers can inhibit particular liver activities, make sure your doctor is aware of any other medications you take. For example, in some cases, your liver may have trouble processing certain antibiotics and anti-seizure medications if you take leukotriene modifiers. If you take zileuton (Zyflo), make sure your doctor monitors your liver. Because of its potential effects on your liver, zileuton may also interfere with warfarin (Coumadin), an anti-blood-clotting medication used to reduce the risk of strokes, or beta-blockers such as propranolol (Inderal), used for treating high blood pressure or migraine headaches.

Phenobarbital (a sedative) and Rifampin (an antibiotic) can increase your liver metabolism, thus breaking down certain other medications, such as montelukast, more rapidly if you take them at the same time. For this reason, your doctor should closely monitor your respiratory symptoms if either of these medications are added to your treatment plan.

Introducing Biologics: Precision/ Personalized Health Care

If you've tried the combination of inhaled corticosteroids, LABAs, and/or LAMAs and still have moderate to severe asthma symptoms, the next step may be the introduction of a *biologic* to your therapeutic regimen. These medications treat the source of the symptoms by targeting the cells and pathways that lead to bronchoconstriction and inflammation of the airways. They work best in patients who have Type 2 high asthma characterized by an increased number of eosinophils, elevated fractional exhaled nitric oxide (known as FeNO), and a high IgE level seen in allergic asthma (see Chapter 11). They are designed as add-on therapy to the controller medications patients are already taking.

The use of biologics has been shown to decrease the frequency of severe asthma episodes, resulting in fewer emergency room visits and hospitalizations. These medications have improved the quality of life for patients whose asthma symptoms are reduced and who consequently miss less school or fewer workdays.

The IgE blocker: Omalizumab

Approved by the FDA in 2003, omalizumab (Xolair) is used to treat allergic asthma in patients as young as 6 years of age. An anti-IgE form of therapy classified as a *recombinant human monoclonal antibody,* omalizumab inhibits the binding of IgE to the IgE receptor on the surface of mast cells and *basophils* (white blood cells that release enzymes during allergic reactions). This reduction of surface-bound IgE limits the allergic response that typically triggers the respiratory symptoms in the vast majority of asthmatics. The result is that IgE is stripped from the cell surface, preventing that cell from releasing chemicals that can trigger the inflammatory response associated with asthma symptoms (see Chapter 11 for more information on IgE).

Omalizumab is administered once every two to four weeks by injection, with the dosage and frequency based on the patient's weight and level of IgE. The FDA has approved its use for additional comorbid (related) diseases such as chronic sinusitis with nasal polyps (see Chapter 10) and *chronic spontaneous urticaria,* or hives that appear and disappear unexpectedly for at least six weeks (see Chapter 8 for more on hives).

In 2007, the FDA added a black box warning to Xolair's label that advised physicians and patients of the possibility of *anaphylaxis* (a potentially life-threatening reaction that affects many organs simultaneously) after administration of the medication.

The big five biologics

The five primary biologic medications are administered as an injection (shot) or infusion (slow drip) at two-week or four-week intervals. Physicians prescribe a specific biologic based on the patient's characteristics (referred to as the patient's *phenotype*) because different biologics block different mediators of inflammation. This individualization is part of the trend toward precision medicine in health care.

The chemical interleukin-5 (IL-5) plays a key role in the allergic inflammatory process, and the use of IL-5 blockers to treat patients with elevated blood eosinophils helps reduce severe asthma attacks. The three IL-5 blockers approved by the FDA so far are

- **Mepolizumab (Nucala):** This IL-5 blocker, given by injection every four weeks, is approved for treatment of patients over 6 years of age with eosinophilic (Type 2) asthma. It's also approved for chronic sinusitis with nasal polyps.
- **Reslizumab (Cinqair):** This IL-5 blocker is approved for asthma patients 18 years of age and older. Administered by a medical provider in a healthcare setting every four weeks, infusions take 20–50 minutes.
- **Benralizumab (Fasenra):** Approved for patients 12 and older, Fasenra has a distinctive mechanism of action that inhibits the eosinophilic inflammatory process. Of the biologics, only Fasenra binds directly to the IL-5 receptor on the eosinophils, enabling the immune system to remove the eosinophils completely. Its unique dosing regimen starts with monthly injections for the first three months followed by injections every eight weeks.

The two approved biologics that work through different mechanisms include the following medications:

- **Dupilumab (Dupixent):** This medication works by blocking other chemicals that cause inflammation called interleukin-4 and interleukin-13, thus preventing the movement of eosinophils into the airways and decreasing mucus production, airway hyperreactivity, and production of IgE. Approved for asthma patients 12 years of age and older, this medication has also been approved for treatment of *atopic dermatitis* (eczema), chronic sinusitis with nasal polyps, and *eosinophilic esophagitis* (inflammation of the esophagus). It's given initially as two injections under the skin and then followed by injections every two weeks.
- **Tezepelumab (Tezspire):** This is the first monoclonal antibody approved by the FDA (in December 2021) to block the activity of a protein called *thymic stromal lymphopoietin,* preventing the start of eosinophilic inflammation. The only biologic that has no limitations on biomarkers (measurable characteristics of the body) such as eosinophil counts, it's given every four weeks.

Some biologics are now approved for self-administration at home. It's important to discuss this option fully with your doctor to understand the risks and benefits of administering biologic asthma treatment yourself outside a medical facility.

Considering Bronchial Thermoplasty

Approved by the FDA in 2010, *bronchial thermoplasty* is a procedure that delivers gentle heat through *bronchoscopy* (inserting a flexible lighted tube into the airways) to shrink the airway smooth muscles in patients over 18 years of age with severe asthma. The treatment is intended only for patients whose asthma isn't well controlled with high-dose inhaled corticosteroids and LABAs.

The procedure is done in a hospital in three sessions, each lasting about one hour, at approximately three-week intervals. The goal is to reduce airway hyperresponsiveness and bronchial obstruction, resulting in improved asthma symptoms.

Bronchial thermoplasty remains the only FDA-approved nonpharmacologic treatment for patients with severe asthma. However, there are still many unanswered questions about the safety of this procedure. With new targeted therapies such as biologics demonstrating good effectiveness and safety for specific asthma phenotypes, this invasive therapy is being used less frequently.

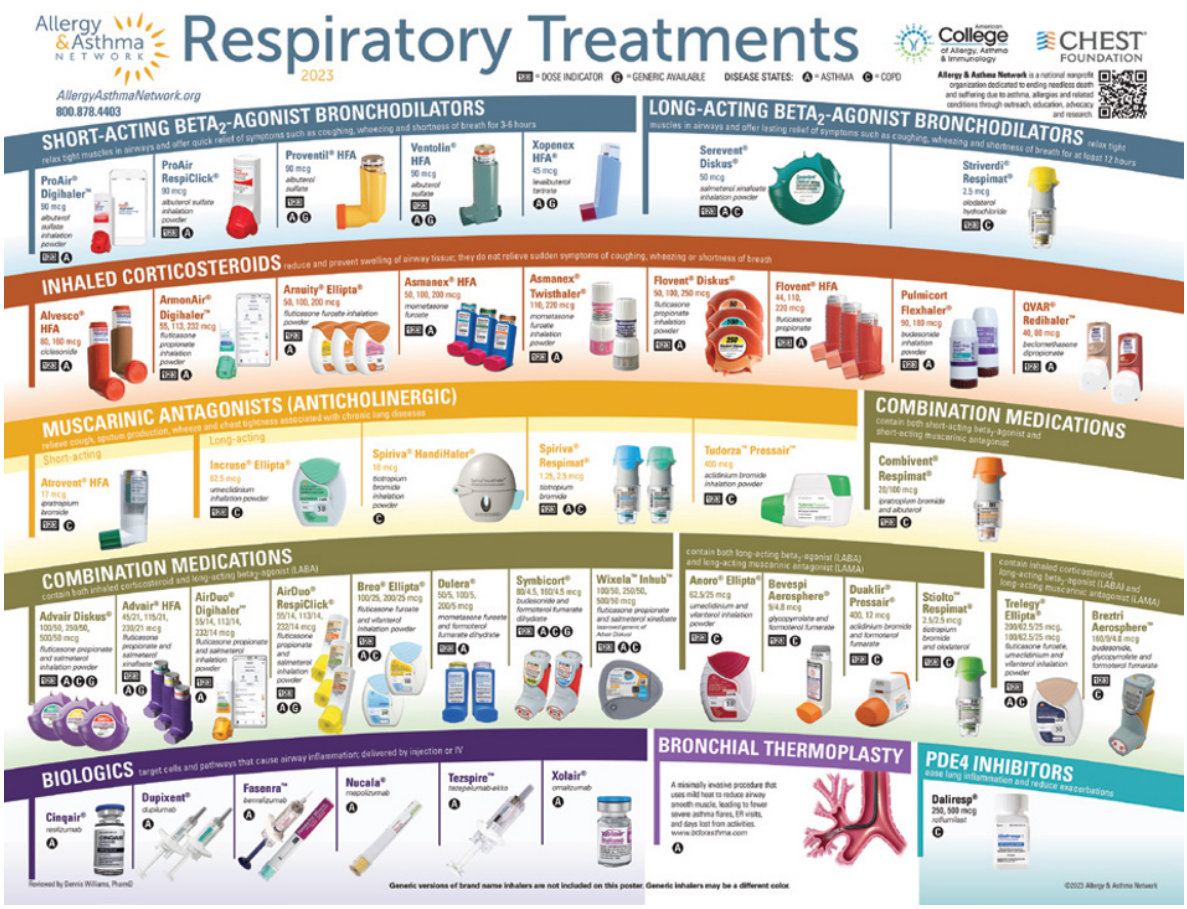
Summarizing Respiratory Treatments

AUTHOR SAYS

We've covered a great deal of information about asthma medications and treatments in this chapter. The Allergy & Asthma Network provided us with a user-friendly chart (see Figure 13-1) that displays and summarizes the many respiratory treatments currently available. This chart is a comprehensive guide to medications for both asthma and chronic obstructive pulmonary disease, or COPD.

SEE YOUR DOCTOR

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.


Allergy & Asthma NETWORK
Respiratory Treatments
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DOSE INDICATOR
GENERIC AVAILABLE
DISEASE STATES: ASTHMA COPD
College of Allergy, Asthma & Immunology
CHEST FOUNDATION
Allergy & Asthma Network is a national nonprofit organization dedicated to ending needless death and suffering due to asthma, allergies and related conditions through outreach, education, advocacy and research.
SHORT-ACTING BETA2-AGONIST BRONCHODILATORS
relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours
ProAir® Digihaler™
ProAir RespiClick®
Proventil® HFA
Ventolin® HFA
Xopenex HFA®
LONG-ACTING BETA2-AGONIST BRONCHODILATORS
relax tight muscles in airways and offer lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours
Serevent® Diskus®
Striverdi® Respimat®
INHALED CORTICOSTEROIDS
reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath
Alvesco® HFA
ArmonAir® Digihaler™
Arnuity® Ellipta®
Asmanex® HFA
Asmanex® Twisthaler®
Flovent® Diskus®
Flovent® HFA
Pulmicort Flexhaler®
QVAR® Redihaler™
MUSCARINIC ANTAGONISTS (ANTICHOLINERGIC)
relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases
Short-acting
Atrovent® HFA
Long-acting
Incruse® Ellipta®
Spiriva® HandiHaler®
Spiriva® Respimat®
Tudorza™ Pressair™
COMBINATION MEDICATIONS
contain both short-acting beta2-agonist and short-acting muscarinic antagonist
Combivent® Respimat®
COMBINATION MEDICATIONS
contain both inhaled corticosteroid and long-acting beta2-agonist (LABA)
Advair Diskus®
Advair® HFA
AirDuo® Digihaler™
AirDuo® RespiClick®
Breo® Ellipta®
Dulera®
Symbicort®
Wixela™ Inhub™
contain both long-acting beta2-agonist (LABA) and long-acting muscarinic antagonist (LAMA)
Anoro® Ellipta®
Bevespi Aerosphere®
Duaklir® Pressair®
Stiolto™ Respimat®
contain inhaled corticosteroid, long-acting beta2-agonist (LABA) and long-acting muscarinic antagonist (LAMA)
Trelegy® Ellipta®
Breztri Aerosphere™
BIOLOGICS
target cells and pathways that cause airway inflammation; delivered by injection or IV
Cinqair®
Dupixent®
Fasenra™
Nucala®
Tezspire™
Xolair®
BRONCHIAL THERMOPLASTY
A minimally invasive procedure that uses mild heat to reduce airway smooth muscle, leading to fewer severe asthma flares, ER visits, and days lost from activities.
www.bitonasthma.com
PDE4 INHIBITORS
ease lung inflammation and reduce exacerbations
Daliresp®
Reviewed by Dennis Williams, PharmD
Generic versions of brand name inhalers are not included on this poster. Generic inhalers may be a different color.
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FIGURE 13-1: Allergy & Asthma Network Respiratory Treatments chart.

ALLERGY & ASTHMA NETWORK

The Allergy & Asthma Network (AAN) is a "national non-profit organization dedicated to ending needless death and suffering due to asthma, allergies and related conditions through outreach, education, advocacy and research." For more information, contact AAN directly via their website (`https://allergyasthmanetwork.org/`) or by calling 800-878-4403.

IN THIS CHAPTER

- Relieving asthma symptoms with short-term medications
- Considering anticholinergic therapy
- Controlling worsening respiratory symptoms with oral corticosteroids
- Understanding updated treatment guidelines

Chapter 14
Treating Asthma Episodes

You can use quick-relief drugs, also known as *rescue medications*, for the rapid treatment of acute airway obstruction and constriction that can occur during an asthma attack. Your doctor usually prescribes these medications along with long-term medications (see Chapter 13) as part of an overall asthma management plan.

Quick-relief medications serve two main purposes:

- **Short-term relief:** To prevent a worsening of respiratory symptoms prior to exposure to asthma triggers, or before engaging in exercise or other strenuous activities that can trigger symptoms of exercise-induced asthma (EIA), as specified by your physician.
- **Rescue:** To reverse rapidly deteriorating respiratory symptoms in cases where an asthma condition suddenly worsens — perhaps due to unanticipated exposure to allergens, irritants, or precipitating factors.

REMEMBER

Doctors commonly prescribe the following types of medications for short-term relief and rescue treatment of asthma:

- Short-acting beta$_2$-adrenergic bronchodilators
- Anticholinergics, which may provide added relief when combined with inhaled short-acting beta$_2$-adrenergic bronchodilators
- Oral corticosteroids, also referred to as *systemic corticosteroids,* which doctors prescribe in closely supervised courses to reestablish control of a patient's asthma in cases of sudden, severe worsening of respiratory symptoms

We discuss these three categories of short-term asthma medications in detail throughout this chapter and list general dosage information for specific drugs in each class.

Relieving Symptoms with Short-Acting Bronchodilators

The primary class of medications physicians prescribe for rescue treatment of asthma is inhaled or aerosol formulations of short-acting beta$_2$-adrenergic (beta$_2$-agonist) bronchodilators. These adrenaline-like drugs work by rapidly relaxing the smooth muscles in your airways, causing your airways to open, usually within five minutes of inhaling the medication.

Physicians consider inhaled or aerosol forms of these short-acting bronchodilators, rather than beta$_2$-adrenergic pills and syrups, the therapy of choice for treating asthma symptoms that suddenly worsen and for preventing EIA. When administered in their inhaled or aerosol formulations, beta$_2$-adrenergic bronchodilators work faster, produce fewer side effects, and provide the most effective, prompt relief of acute respiratory symptoms.

TIP

To prevent EIA, your doctor may recommend that you inhale a dose of your prescribed short-acting beta$_2$-adrenergic bronchodilator 15 to 30 minutes before you begin to exert yourself. (See Chapter 9 for a more extensive discussion of EIA.)

The principal short-acting beta$_2$-adrenergic bronchodilators prescribed in the United States include the following:

- Albuterol (Ventolin, ProAir)
- Terbutaline (now available as generic)
- Levalbuterol (Xopenex)

Table 14-1 provides detailed dosage information for individual short-acting beta$_2$-adrenergic bronchodilators.

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

TABLE 14-1 Short-Acting Beta$_2$-Adrenergic Bronchodilators

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose (Under 12)	Total Usual Daily Adult Dose
Albuterol	MDI: 90 mcg/inhalation, 200 inhalations/canister CDN solution with calibrated dropper: 5 mg/mL (0.5%) CDN unit dose bottle (nebule): 2.5 mg/3 mL (0.083%) Tablets: 2, 4 mg Syrup: 2 mg/5 mL	Ventolin Ventolin HFA (in MDI, CDN, tablet, and syrup) ProAir RespiClick ProAir Digihaler	MDI: Two inhalations 4 times per day or as needed prior to exercise CDN solution: 0.05 mg per kg of child's weight in 2 to 3 mL of saline solution every 4 to 6 hours CDN unit dose (2–11 years, more than 15 kg weight): 2.5 mg (one unit dose/nebule) 3 to 4 times per day Tablets (ages 6–11): Starting dose, one 2 mg tablet 4 times per day, maximum of 24 mg per day Syrup: 1 teaspoon every 6 hours	MDI: Two inhalations 4 times per day or as needed prior to exercise CDN solution: 1.25 to 5 mg in 2 to 3 mL of saline solution every 4 to 8 hours CDN unit dose: 2.5 mg (one unit dose/nebule) 3 to 4 times per day Tablets: Starting dose, one 2 or 4 mg tablet 3 to 4 times per day, maximum of 32 mg per day Syrup: 1 to 2 teaspoons every 6 hours

(continued)

TABLE 14-1 *(continued)*

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose (Under 12)	Total Usual Daily Adult Dose
Albuterol	CDN: 0.63 mg/3 mL (vial) 1.25 mg/3 mL (vial)	AccuNeb	(Ages 2–12) Low dose: 0.63 mg/vial 3 to 4 times per day High dose: 1.25 mg/vial 3 to 4 times per day	Indicated for children 2–12
Albuterol with budesonide	MDI (HFA): 90 mcg albuterol with 80 mcg budesonide	Airsupra	Approved for 18 years of age and older	Two inhalations for as-needed treatment. Maximum 6 doses per 24 hours
Levalbuterol	MDI: 45 mcg/inhalation, 200 inhalations per canister CDN: 0.31 mg/3 mL nebule 0.63 mg/3 mL nebule 1.25 mg/3 mL nebule	Xopenex Xopenex HFA	MDI: Two inhalations 4 times per day or as needed CDN (ages 6–11): 0.31 mg per nebule every 6 to 8 hours	CDN: Low dose: 0.63 mg per nebule every 6 to 8 hours High dose: 1.25 mg per nebule every 6 to 8 hours if symptoms are acute or unresponsive to low dose
Terbutaline	MDI: 90 mcg/inhalation, 300 inhalations per canister	Now available as generic brands	MDI: Two inhalations 4 times per day or as needed prior to exercise	MDI: Two inhalations 4 times per day or as needed prior to exercise

Note: 1 kg (kilogram) = 2.2 pounds; mcg = microgram; mg = milligram; mL = milliliter; CDN: compressor-driven nebulizer; HFA: hydrofluoroalkane; MDI: metered-dose inhaler.

Using short-acting bronchodilators effectively

If you correctly use the long-term asthma medications prescribed by your physician and are able to effectively avoid allergens, irritants, and other potential triggers, you can control your asthma most of the time. However, given the unpredictable nature of most people's lives, you may experience situations where your respiratory condition suddenly worsens, most often due to unexpected and unavoidable exposure to certain asthma triggers. (See Chapter 6 for details of asthma triggers.)

Make sure you discuss with your doctor what type of short-acting bronchodilator may work for you when these situations occur, based on your specific asthma condition, for the prompt relief of an asthma episode.

AUTHOR SAYS

In our experience, most patients who successfully adhere to their asthma management plan, especially by sticking to their regimen of long-acting asthma controller medications, usually wind up using short-acting bronchodilators the least. In those rare instances when these patients do need to resort to using their short-acting bronchodilator, they often quickly regain control of their condition before it seriously worsens.

Getting more bronchodilation per breath

TIP

To maximize the quick-relief action of short-acting beta$_2$-adrenergic bronchodilators, use these medications with the appropriate delivery devices. Holding chambers (spacers) and nebulizers work especially well, ensuring that your lungs receive short-acting bronchodilator medications. (See Chapter 12 for more information.)

If your short-acting bronchodilator isn't providing rapid relief of symptoms, determine if any of the following factors may be causing the problem:

- **You're not using the product properly.** Make sure your doctor shows you the proper technique for using your inhaler and reviews your technique during office visits.
- **Your canister may be empty.** To check whether you need a new canister, remove the container from the actuator sleeve and put it in water (a sink works well for this test). If the canister floats to the surface, it's likely almost empty.
- **The mouthpiece (where you inhale) may be dirty or blocked.** Keep your inhaler clean. (Chapter 12 provides details about cleaning your mouthpiece.)

Choosing better bronchodilators

WARNING

Don't depend on over-the-counter (OTC) inhaled bronchodilators such as AsthmaHaler, Asthmanefrin, Primatene Mist, or similar products. In many cases, these OTC products provide much shorter relief than prescription inhaled short-acting beta$_2$-adrenergic bronchodilators, and they often contain *epinephrine* (adrenaline) or similar drugs.

Although epinephrine is used in emergency treatment and in self-injection kits, such as EpiPen or Twinject, for cases of severe asthma attacks and *anaphylaxis* (a potentially life-threatening reaction that affects many organs simultaneously),

routine use of the drug can cause serious adverse side effects, including shakiness, an increase in blood pressure, or a rapid or irregular heartbeat. Because of this danger, avoid using OTC bronchodilators if you have a heart condition.

Avoiding potential adverse side effects of short-acting bronchodilators

TECHNICAL STUFF

The principal side effects of short-acting beta$_2$-adrenergic therapy, although relatively mild — especially when used in inhalation forms (in contrast with oral or injectable formulations) — can be tremors, increased heart rate, and palpitations (rapid or irregular heart rate). These side effects occur as a result of the drug's direct stimulation of the heart and skeletal muscles, and they often go hand in hand with the drug's *bronchodilator action* (airway dilation), especially at high or frequent dosages.

In most cases, patients experience few, if any, of the potentially unpleasant side effects of short-acting bronchodilators by using these medications only for the quick relief of worsening respiratory symptoms. As effective as quick-relief bronchodilators can be for rescue purposes — especially a product such as levalbuterol (see "Introducing new and improved bronchodilation," later in the chapter) — you should use short-acting bronchodilators only as needed, rather than on a routine basis, especially if you have persistent asthma.

Instead of using rescue products on a day-to-day basis to manage your respiratory symptoms, make sure you're consistently taking the long-term medications your physician prescribes (as part of your overall asthma management plan) to maintain control over your asthma condition. (See Chapter 13 for detailed information on long-term products.)

Bucking bronchodilator dependence: Avoiding overuse of your quick-relief product

WARNING

If you find that you're taking more than eight inhalations per day or using more than one canister (usually 200 inhalations) of a short-acting bronchodilator per month, your asthma isn't adequately controlled. In that case, see your doctor to discuss adjusting your asthma management plan.

Ensuring that your asthma management plan is as effective as possible may mean that you need to take long-term anti-inflammatory medication, such as inhaled corticosteroids, on a regular basis to control your asthma (see Chapter 13).

Contact your doctor immediately if you're using your short-acting beta$_2$-adrenergic bronchodilator more often than once every one to two hours. Overusing this type of

rescue medication at that rate (more frequently than once every one to two hours) is a sign that your asthma symptoms are worsening.

AUTHOR SAYS

Most allergists would agree that they've never seen the overuse of inhaled short-acting beta$_2$-adrenergic bronchodilators (LABAs) as single agents correct worsening asthma symptoms. In fact, overusing your short-acting bronchodilator (SABAs) alone almost always worsens your condition because frequently using this medication doesn't address the real source of the problem — the underlying airway inflammation. Studies have shown that overuse of albuterol as a single agent is associated with increased risk of severe asthma episodes.

The use of albuterol monotherapy (single medication) for rescue treatment of asthma symptoms is not supported by the National Asthma Education and Prevention Program (NAEPP). Extensive data shows that either inhaled corticosteroid with formoterol or inhaled corticosteroid with albuterol is superior to the use of albuterol alone. Although available in other countries, inhaled corticosteroid with formoterol is presently not FDA approved for rescue indication in the United States. The only inhaled corticosteroid with albuterol combination presently available, by prescription, in the United States is AirSupra (budesonide with albuterol).

Taking many medicines can make matters worse

WARNING

Using short-acting bronchodilators while also taking beta-blockers, such as Inderal, Lopressor, and Corgard (frequently prescribed for migraine headaches, high blood pressure, glaucoma, angina, or hyperthyroidism), may cancel out the benefits of both medications. If you need both medications, your doctor may recommend alternatives to beta-blockers or may prescribe ipratropium bromide as an alternative quick-relief medication for your asthma symptoms (see "Reversing Airflow Obstruction with Anticholinergics," later in this chapter). This potentially adverse interaction between drugs is a particularly good example of why you need to make sure all your physicians know the medications you're taking for all your medical conditions (see Chapter 3).

Introducing improved bronchodilation

AUTHOR SAYS

With improved chemical technology, researchers have developed a new version of albuterol known as *levalbuterol* (Xopenex). This third-generation short-acting beta$_2$-adrenergic bronchodilator provides the same level of bronchodilation at one-fourth the dose of albuterol. As a result, the dose-dependent side effects typical of older short-acting bronchodilators, such as tremors, increased heart rate, and palpitations (rapid or irregular heart rate), are substantially reduced and even eliminated for many patients.

QUICK FIX VERSUS LONG-TERM ASTHMA MANAGEMENT

Controlling asthma means treating the underlying inflammation of your airways. Don't substitute the quick fix of an inhaled short-acting beta$_2$-adrenergic bronchodilator for consistent routine use of the appropriate long-term asthma medications your doctor prescribes.

Think of your asthma as a smoldering campfire in your lungs. If you pay attention to the embers only *after* they flare up, containing the flames becomes a serious problem. The goal of your asthma management plan is to get your asthma under control to the extent that you only rarely use bronchodilators on an as-needed basis — usually to reduce the risk of symptoms when you're exposed to unavoidable asthma triggers or precipitating factors, especially exercise.

Also, beware of relying on inhaled short-acting bronchodilators, because the quick relief these products provide can give you the false impression that your asthma is just a set of symptoms, rather than a serious underlying medical problem. Imagine having a high fever and taking a pain reliever only to reduce your discomfort. You may temporarily feel better, but if the underlying cause of your high temperature is a severe inflammation such as appendicitis, treating only the symptoms can lead to a very serious situation — in this case a ruptured appendix — because you may not realize the gravity of your condition, thus delaying necessary treatment.

Likewise, if zapping your wheezing with an inhaled short-acting beta$_2$-adrenergic bronchodilator is the only way you deal with your persistent asthma, you may feel fine for a short while. However, if you use your peak-flow meter (see Chapter 5) to check your peak expiratory flow rate, or if your doctor performs a spirometry procedure (see Chapter 3), you quickly realize that your airflow is significantly decreased and your lung functions are below normal. When based solely on how they're feeling, most asthma patients tend to underestimate the magnitude of their airway obstruction. Often, it isn't until they can objectively measure their airflow, typically by using a peak-flow meter, that they really become aware of their deteriorating condition.

Levalbuterol has been particularly useful when given by nebulizer to especially sensitive groups, such as older adults and children. Levalbuterol may be prescribed off-label for use in children under 6.

Reversing Airflow Obstruction with Anticholinergics

TECHNICAL STUFF

Anticholinergic drugs block *acetylcholine* (a neurotransmitter that stimulates mucus production) and therefore help reduce mucus in your airways. These drugs also relax the smooth muscle around the large and medium airways of the lungs. Inhaled anticholinergics often work especially well when doctors combine their use with short-acting beta$_2$-adrenergic bronchodilators to open your airways.

REMEMBER

Keep in mind that anticholinergics on their own have little effect on asthma symptoms triggered by exposure to allergens. These products also don't prevent symptoms of EIA.

Anticholinergic medications are usually most effective for patients who have partially reversible airflow obstruction or who are prone to producing greater amounts of mucus. Doctors frequently prescribe these products for patients with chronic bronchitis and emphysema, collectively referred to as *chronic obstructive pulmonary disease* (COPD).

The principal anticholinergic used in the United States is ipratropium bromide, a quick-relief drug that doctors often prescribe in conjunction with a short-acting beta$_2$-adrenergic bronchodilator for dilating the airways. Ipratropium bromide can provide greater bronchodilation when combined with a bronchodilator such as albuterol into a single inhaled product (Combivent). Table 14-2 lists general dosage information for anticholinergic medications.

Ipratropium bromide has an excellent safety profile and few potential adverse side effects. Those side effects can include dry mouth, airway secretions, and, in rare cases, wheezing. Don't accidentally spray this product in your eyes, because it can temporarily blur your vision.

SEE YOUR DOCTOR

The names, formulations, and doses in the following table are evidence-based recommendations, which can change at any time. This is not intended to be medical advice, and you should discuss your individual needs with your doctor.

SEE YOUR DOCTOR

Because the use of anticholinergics may complicate prostate problems, physicians need to assess the condition of older male asthma patients prior to prescribing any medication that contains ipratropium bromide.

TABLE 14-2 Anticholinergic Medications

Active Ingredient	Formulation	Brand Name	Total Usual Daily Child Dose (Under 12)	Total Usual Daily Adult Dose
Ipratropium	MDI: 18 mcg/inhalation, 200 inhalations per canister CDN: 0.5 mg/2.5 mL (vial)	Atrovent	Not approved for children under 12	MDI: 2 to 3 inhalations every 6 hours, not to exceed 12 inhalations per day CDN: One vial every 6 to 8 hours
Ipratropium with albuterol	MDI: 370 mcg/inhalation, 300 inhalations per canister	Combivent	Not approved for children under 12	2 inhalations 4 times a day
Ipratropium with albuterol	CDN: 0.5 mg ipratropium, 2.5 mg albuterol/3.0 mL (vial)	DuoNeb	Not approved for children under 12	CDN: One vial 4 times a day

Note: mcg = microgram; mg = milligram; mL = milliliter; CDN: compressor-driven nebulizer; MDI: metered-dose inhaler.

Looking at Short-Term Rescue Use of Oral Corticosteroids

In addition to their use as long-acting medications, oral corticosteroids (see Chapter 13) can play a quick-relief role in your asthma management. During moderate or severe asthma episodes, your doctor may use oral corticosteroids to rapidly gain control over worsening symptoms. In such cases, oral corticosteroids can help your other quick-relief medications work more effectively, resulting in a more rapid reversal or reduction of airway inflammation, speeding recovery, and reducing the rate of relapse.

A short course of oral corticosteroids generally lasts three to ten days, depending on the severity of your symptoms and your response to treatment. Don't suddenly stop taking oral corticosteroids without checking with your physician first.

For patients who use oral corticosteroids longer than two weeks, doctors frequently taper off the dosage to minimize side effects, instead of stopping the drug abruptly. This slow tapering allows most patients to regain their ability to produce their own natural corticosteroids from the *cortex* (outer layer) of their adrenal glands.

Prolonged use of oral corticosteroids can lead to adverse *systemic* (affecting multiple organs of your body) side effects, including fluid retention, altered blood sugar levels, weight gain, peptic ulcers, mood alteration, high blood pressure, reduced bone density, and impaired immune functioning. For this reason, doctors often prescribe these drugs only as a last resort and discontinue them (by gradual tapering) as soon as symptoms are under control.

Updating Asthma Treatment Guidelines

In 2019, new guidelines for the treatment of asthma from the Global Initiative for Asthma changed the way healthcare providers treat asthma symptoms. Short-acting $beta_2$-agonists (such as albuterol) alone are no longer recommended for the rapid relief of asthma symptoms. In fact, overuse of inhaled beta-agonists increases the risk of asthma deaths. Instead, for mild asthma, the new recommendation in other countries is that low-dose inhaled corticosteroids combined with low-dose formoterol, a long-acting $beta_2$-agonist, should be prescribed and taken as needed to reduce the risk of asthma attacks and control respiratory symptoms.

If formoterol isn't being used, the use of a short-acting $beta_2$-agonist, such as albuterol, should always be followed with the administration of a low-dose inhaled corticosteroid. Studies have shown that the combination of a bronchodilator and inhaled corticosteroid prescribed on an as-needed basis is equivalent — and in some cases superior — to daily inhaled corticosteroid maintenance therapy in reducing asthma attacks.

In 2020, an update to the asthma guidelines from the U.S. government's National Heart, Lung, and Blood Institute (NHLBI) included new recommendations on intermittent use of inhaled corticosteroids. For patients with mild persistent asthma, two possible treatment approaches are available for Step 2 therapy (see Chapter 5). First is a daily low-dose inhaled corticosteroid and as-needed use of a short-acting bronchodilator for quick relief of respiratory symptoms. Second is the intermittent, as-needed use of a short-acting bronchodilator always followed by an inhaled corticosteroid.

For patients older than 4 with moderate to severe persistent asthma who are already on a daily inhaled corticosteroid, the NHLBI guidelines recommend an inhaled corticosteroid with formoterol as single maintenance and reliever therapy (SMART) to be used as both a daily and an as-needed treatment for asthma symptoms. SMART is appropriate treatment in patients on both low- and medium-dose inhaled corticosteroids. For children ages 4–11, the maximum number of inhalations per day is 8; for patients 12 and older, the maximum number of

inhalations per day is 12. If this dosage doesn't control symptoms, patients should contact their physician for further instructions. Although available in other countries, inhaled corticosteroid with formoterol is presently not FDA approved for rescue indication in the United States.

In 2023, the FDA approved Airsupra, containing albuterol, a short acting beta$_2$-agonist, and budesonide, an anti-inflammatory inhaled corticosteroid, as the first fixed-dose combination rescue medication in a metered-dose inhaler for the as-needed treatment or prevention of asthma attacks in patients 18 years of age and older. Studies show that this combination medication reduces the risk of severe asthma episodes in patients with moderate to severe asthma compared to albuterol alone when used as rescue medication as needed to treat respiratory symptoms. In addition, Airsupra improves lung function in patients with mild to moderate asthma compared to either albuterol or budesonide alone.

4 Special Asthma Conditions

IN THIS PART . . .

Handle your child's asthma effectively.

Manage asthma during pregnancy.

Know how asthma can affect older people.

Understand how COPD, AERD, VCD, and obesity can overlap with and worsen asthma symptoms.

IN THIS CHAPTER

- Figuring out how asthma affects your child
- Recognizing symptoms that suggest asthma
- Looking at special concerns
- Heading off asthma problems at school or day care

Chapter 15
Asthma and Children and Teens

Parents know that no one is more precious to them than their children. Therefore, parents want to treat any ailment that affects their youngsters as effectively as possible. If your child has asthma, the good news is that with a proper diagnosis, appropriate management, and a firm understanding of the disease, you can help your child effectively control their condition.

AUTHOR SAYS

Unfortunately, some parents (and even some doctors) don't understand asthma well enough to recognize or diagnose the disease properly. Too often, this misunderstanding results in the misdiagnosis of children with asthma as having chronic bronchitis or recurring colds instead. In these cases, children may not receive the appropriate treatment, and their symptoms may worsen, leading to severe asthma episodes that may require emergency measures to treat.

In fact, asthma — the most common chronic childhood disease in the United States — affects at least 5 million children. Current estimates are that only half these youngsters receive an accurate diagnosis and effective treatment.

TIP

However, these alarming asthma statistics don't need to continue. Treating your child's asthma early and aggressively, as well as practicing long-term preventive maintenance, can make the difference between a sickly youngster and a healthy, well-adjusted kid who rarely experiences problematic symptoms.

In this chapter, we help you understand your child's asthma and the way their condition is evaluated, as well as discuss how to identify their asthma triggers. We also discuss how to manage childhood asthma and how to handle your child's asthma at school and at daycare, including participating in physical education and athletics.

Understanding Your Child's Asthma

Asthma is a chronic inflammatory disease of the airways that can make getting air in and especially out of the lungs difficult. Beyond the serious health risks asthma can pose for your child, properly managing the disease is vital for your youngster's overall growth: Anything that restricts proper breathing can impair their physical and mental development.

Asthma often begins in childhood and affects boys more commonly than girls. Most children who develop asthma experience their first symptoms of the disease before they reach their third birthday.

TIP

Look for the following signs and symptoms as possible asthma indicators in your child. (Keep in mind, however, that not every child with the disease experiences all these signs and symptoms.)

- Persistent coughing and wheezing, and recurring or lingering chest colds.
- An expanded or overinflated chest and hunched shoulders.
- Coughing, wheezing, or extreme shortness of breath during or after exercise. These symptoms may signal the onset of exercise-induced asthma, or EIA (see "Participating in PE: Exercise and asthma," later in this chapter).
- Snoring, especially in preschool children. According to recent studies, a strong association between snoring and asthma exists in children ages 2 to 5.
- Coughing at night, in the absence of other symptoms such as a cold.

Because you may find recognizing the preceding symptoms more difficult when observing infants and young children, watch for the following signs of possible asthma trouble:

WARNING

- *Cyanosis,* very pale or blue skin color due to severe airway obstruction blocking the normal flow of oxygen into the lungs. This can occur in a very severe asthma attack and requires emergency treatment.

- Deep and rapid rib muscle movements, also known as *retractions,* which can occur when an infant or young child is having trouble breathing properly.
- Difficulty in nursing or eating.
- Lethargic activity and slow responses, including not recognizing or responding to parents.
- *Nasal flaring* (rapidly moving nostrils), which can be a sign of severe asthma.
- Soft, shallow crying.

In addition to these signs, you need to consider the presence of *atopy* (the genetic susceptibility for the immune system to produce a specific class of antibodies called immunoglobulin E, or IgE). These antibodies react with inhaled allergens, leading to asthma. Atopy (a genetic predisposition to developing allergic conditions) is a key predisposing factor for your child developing asthma (see Chapters 1 and 6).

Atopic conditions, including food allergies (see Chapter 8), *allergic rhinitis* (hay fever; see Chapters 7 and 10), and *atopic dermatitis* (eczema; see Chapter 8), can indicate a potential predisposition for asthma, especially in infants and young children. In fact, more than three-quarters of all children who develop asthma also have allergies. In many cases, allergic reactions associated with the response to inhalant and ingested allergens can also cause chest symptoms of wheezing and coughing in a child with asthma.

Inheriting asthma

If you think your child may have asthma, consider your family's medical history. Two-thirds of asthma patients have a close relative with the disease. Likewise, if you or your child's other biological parent has asthma, your child's chances of developing asthma are 25 percent; if *both* you and your child's other parent have asthma, your child's odds of developing asthma double to 50 percent.

However, asthma in your family doesn't guarantee that your child will develop asthma. Your child inherits the *tendency to develop* the disease, not the disease itself. If neither you nor your child's other biological parent has asthma, the odds of your child developing this disease are no greater than 15 percent.

Identifying children's asthma triggers

Although hereditary factors may increase your child's likelihood of developing asthma, environmental triggers and other precipitating factors usually bring on the symptoms. (See Chapter 6 for more detailed information on these triggers and

precipitating factors.) Most physicians agree that viral respiratory infections are the most common triggers of asthma attacks in infants and young children, causing increased hyperresponsiveness and remodeling of the airways. The most serious air pollutant and irritant in terms of asthma is tobacco smoke. Parents absolutely should not smoke around a child, especially if the youngster has asthma. Even if your child is out (for example, at school), don't smoke in the home. The lingering odor of tobacco smoke can still trigger your child's asthma symptoms. According to numerous studies, exposure to maternal smoke is a major risk factor in the early onset of asthma in infancy. In fact, an infant whose mother smokes is almost twice as likely to develop asthma.

Controlling — not outgrowing — asthma

The idea that all children eventually "outgrow" asthma is a dangerous myth, and withholding treatment, hoping that somehow your child's asthma will just go away, is a misguided approach. As children grow, their lungs and airways become larger. If the amount of airway obstruction stays the same, the blockage may proportionally constitute a smaller part of the total airway diameter, thus resulting in fewer symptoms as an adult. In addition, many children do have fewer symptoms and a decrease in airway hyperreactivity as they grow older, but early and aggressive treatment of asthma significantly contributes to a better outcome.

Your child's sensitivities, however, may not entirely disappear, and the possibility exists that a lack of treatment may lead to irreversible airway changes. Clear and compelling evidence shows that early diagnosis and treatment results in fewer asthma symptoms.

Your child's asthma symptoms may diminish or may no longer be apparent, but the increased airway sensitivity remains — just as your child's fingerprints stay the same even though their body grows and develops. Asthma isn't a disease you can really cure; it's a condition you must control.

Treating asthma early to avoid problems later

In many cases when adult patients are referred to the doctor with severe asthma, their condition may not have deteriorated to such an extent if their asthma had been properly treated during childhood. The first two years after asthma has been diagnosed in your child generally are the time when aggressive medical treatment can dramatically improve the potential for maintaining normal lung function.

Unfortunately, some parents focus only on immediately treating serious asthma attacks instead of managing their child's condition on a consistent, everyday basis. This approach is misguided. Don't watch and wait to see how asthma affects your child. If your child has a persistent cough, shortness of breath, lingering colds, or other early signs of asthma (see the symptoms and signs we list in the first part of this section), make sure a doctor checks their lung function. This testing can help determine whether asthma is, in fact, the cause of your child's symptoms.

Identifying Childhood-Onset Asthma

When a child, particularly one who's very young, is the patient, what may seem an obvious and easily identifiable asthma diagnosis isn't always the case. Asthma is a complex condition with many possible combinations of symptoms that can vary widely from patient to patient. In fact, your child's symptoms can change over time.

The process of diagnosing your child's condition should include the following steps:

- A complete medical history
- A physical examination
- Lung-function tests
- Any other tests your doctor considers necessary to determine the nature of your child's ailment

To diagnose your child's asthma, your doctor should establish the following key points:

- Your child experiences episodes of airway obstruction.
- The airway obstruction is at least partially reversible.
- Your child's symptoms result from asthma, not any of the other conditions we explain in "All That Wheezes Isn't Asthma," later in this chapter.

Taking your child's medical history

REMEMBER

A thorough and complete medical history is vital to diagnosing your child's condition. In addition to asking about the symptoms and signs of childhood asthma we describe in "Understanding Your Child's Asthma," earlier in this chapter, your doctor may inquire about the following:

- Any family history of allergies or asthma. (As we explain in "Inheriting asthma," earlier in this chapter, genetics play a role in asthma development.)
- Any exposures your child receives to common asthma triggers, such as inhalant allergens and irritants — especially tobacco smoke — or any other pollutants. (See Chapter 6 for more on triggers and precipitating factors.)
- Any times your child has been hospitalized for respiratory problems. Your doctor should also ask about any medications your child takes, for respiratory symptoms or for other conditions.

Examining your child for signs of asthma

A physical exam of a child with suspected asthma usually involves the following:

- Checking for signs of hunched shoulders, chest deformities, and pale skin.
- Examining breathing passageways, from nose to chest. (See Chapter 3 for details of physical exams.)
- Looking for evidence of other atopic diseases, such as allergic rhinitis or atopic dermatitis, which may indicate a predisposition to asthma.
- Observing breathing rate and rhythm. Your doctor listens with a stethoscope held to the chest and back over areas of your child's lungs to check for the following signs and sounds of airway obstruction:
  - Wheezing or other sounds not usually associated with normal breathing
  - Unusually prolonged exhalations
  - Rapid, shallow respirations (panting) in more severe cases

Testing your child's lungs

After taking your child's medical history and performing a physical examination, your doctor may conduct lung-function tests if your child is older than 4 or 5 years old. These tests are vital in diagnosing asthma because they can tell whether airway obstruction has limited or affected your child's lung function.

TECHNICAL STUFF

To diagnose asthma in children older than 4 or 5, doctors often use a procedure known as *spirometry*. Spirometry involves using a *spirometer* (pulmonary function machine) to measure your child's airflow, before and 15 minutes after they inhale a short-acting bronchodilator, to determine improvement in lung function. See Chapter 3 for more details on spirometry.

Spirometry tests are difficult, if not impossible, to perform on children under 4 years old. However, by age 6, most children are quite capable of performing accurate and reliable spirometry (if they feel like it!). To properly diagnose an infant or young child with asthma, your doctor may need to rely on your child's medical history and physical examination. In some cases, your doctor may prescribe a trial course of a nebulized beta$_2$-adrenergic bronchodilator and/or anti-inflammatory medications to evaluate your child's response. (For an explanation of nebulizers, see "Using a nebulizer with your infant or toddler," later in this chapter.)

All That Wheezes Isn't Asthma

MYTH BUSTER

Although the misdiagnosis of asthma (often as bronchitis) is a common problem in treating childhood respiratory conditions, in some cases, other ailments can cause symptoms that resemble asthma. These other ailments include

- Abnormal development of blood vessels, known as *vascular rings,* around the *trachea* (windpipe) and esophagus
- Congenital heart disease, often leading to congestive heart failure
- Cystic fibrosis
- Viral or bacterial bronchitis or pneumonia
- Viral bronchiolitis (also known as *respiratory syncytial virus,* or RSV), a serious respiratory infection that can occur in the first two years of life

  RSV may resemble an acute asthma attack. This disease usually occurs during the winter months in children under 2 years of age. Studies have shown that more than half of children who experience viral bronchiolitis infections and who have a family history of allergy go on to develop asthma.
- Vocal cord dysfunction

REMEMBER

WARNING

In numerous cases, children suddenly start wheezing because a coin, food particle, or other foreign body has become lodged in their windpipe, respiratory tube, or esophagus. If you suspect a foreign object is lodged somewhere in your child's respiratory system, seek medical help immediately.

Focusing on Issues Specific to Childhood Asthma

After your child's doctor has diagnosed your child's asthma, the doctor should develop an appropriate asthma management plan, in consultation with you and your child (if your child is old enough to participate). Your child's management plan should consist of specific avoidance, medication, monitoring, and assessment measures, and it should also provide steps that you or your child can take in case their asthma symptoms suddenly worsen.

REMEMBER

The basic components of an appropriate and effective asthma management plan include

- **Reducing your child's level of exposure to asthma and allergy triggers.** We describe these triggers in Chapter 6. For detailed tips and information on avoidance measures, trigger control, and allergy-proofing, see Chapter 7.
- **Monitoring your child's peak-flow rates.** Your doctor should show you and your child (if your youngster is older than 4) how to use a peak-flow meter. (See "Peak-flow meters and school-age children [ages 5 to 12]," later in this chapter.) Using this simple device at home and school to measure peak expiratory flow rate (PEFR) can help detect early symptoms of worsening asthma, prompting you or your child to make the appropriate change in medications or, if needed, to seek medical attention.

  WARNING

  Children and their parents often don't perceive the early symptoms of worsening asthma without a peak-flow meter. As a result, you may not understand or notice when your child's asthma symptoms worsen, thus critically delaying the proper medical treatment. (For detailed instructions on using peak-flow meters, see Chapter 5.)
- **Assessing and monitoring your child's lung function during regular office visits.** These tests and assessments, as well as the PEFR numbers that you (or your child) record in an asthma symptom diary (see Chapter 5), are vital to tracking how your child's condition develops and responds to prescribed treatment.
- **Using long-term preventive medications (see Chapter 13) that control your child's underlying airway inflammation, congestion, constriction, and hyperresponsiveness.** See Chapter 1 for details of how asthma affects the body.

TIP

- **Implementing an asthma management plan for your child's school or day care.** Prepare an emergency asthma management plan that specifies short-term, fast-acting rescue medications for use only if your child's condition suddenly deteriorates. This type of action plan should also clearly explain how

to adjust your child's medications in response to particular signs, symptoms, and PEFR levels. Likewise, this action plan should tell you (or your child) when to call for medical help. (See "Handling Asthma at School and Day Care," later in this chapter, for more information.)

- **Educating yourself, your child, your child's teacher, and your family.** Asthma education can involve information and resources that your doctor, clinic staff, and patient support groups provide or recommend, as well as relevant books, newsletters, videos, and other helpful materials.

Teaming up for the best treatment

Integrate any treatment your youngster may receive from an asthma specialist (an allergist or pulmonologist) and your child's asthma management plan with the general care your pediatrician, family doctor, or primary care physician provides. A team approach by your child's physicians can eliminate the risk of different doctors prescribing treatments for various childhood ailments that may, in combination, produce adverse side effects.

Managing asthma in infants (newborn to 2 years old)

The most difficult part of treating an infant with asthma is that the child isn't old enough to tell you what's wrong. Unfortunately, no devices are currently available for physicians to use to measure infants' lung function. Special techniques do exist at a few major medical centers at this time, but scientists use them only for research purposes and not in clinical practice. Therefore, determining the extent and type of your baby's respiratory problems can present some unique challenges. In these cases, your doctor mainly relies on medical history (including family history), physical examination, and response to medical therapy.

Depending on your child's condition, your doctor may prescribe some of the following medications to control their asthma:

- If your infant's asthma symptoms are mild or intermittent, the doctor may prescribe an inhaled short-acting beta$_2$-adrenergic in a nebulizer or oral beta$_2$-adrenergic syrup to reduce airway obstruction. Your doctor also can prescribe a pediatric oral granule formulation of montelukast (Singulair) approved for ages 12 to 23 months. Administer the medication directly into the baby's mouth or by mixing it with soft food. According to the product insert, the recommended foods are applesauce, carrots, rice, or ice cream.

- If your child suffers from more severe symptoms, your doctor may prescribe a daily long-term preventive medication such as an inhaled corticosteroid via nebulizer (budesonide) or an inhaler. Because of your child's young age, administering any of these medications with an inhaler requires using a holding chamber (spacer) and a mask. (See Chapter 12 for more on asthma medications and delivery devices.)
- If your child suffers a severe asthma episode, your doctor may prescribe a short course of oral corticosteroids available in syrup form (Orapred, Prelone, Pediapred) or as a tablet (prednisone).

Using a nebulizer with your infant or toddler

If your doctor prescribes nebulizer therapy for your infant or toddler, make sure you, as well as any other person who may be taking care of your child (such as a grandparent, babysitter, or day care provider), understand how to use a nebulizer appropriately and effectively. Using this device may be challenging for an older child, but for an infant or toddler who may be struggling to breathe, using a nebulizer can prove especially difficult. Chapter 12 provides more detailed instructions and tips on using nebulizers properly and effectively.

TIP

When using a nebulizer with a very young child (your doctor should give you specific advice based on your child's condition), make stress reduction — for both you and your child — your first consideration. Try making the use of the nebulizer a more pleasant experience and maybe even a special daily occasion. Hold and cuddle your child first, and then slowly but firmly move the mask closer to your youngster's face.

TIP

LISTENING TO YOUR CHILD

Because children under 2 years old aren't able to use a peak-flow meter, you may consider using a stethoscope to listen to your child's lungs. Some parents find that using a stethoscope can help them detect an asthma attack in their infant or young child at an earlier stage and may enable them to report their youngster's asthma symptoms more accurately to their physician.

Consult your child's physician to see whether using a stethoscope can help you. Likewise, ask your doctor for instructions on using the device properly. Keep in mind that a stethoscope detects breathing problems only if your child's lung function drops by about 25 percent.

If your child isn't experiencing sudden-onset severe respiratory symptoms, you can introduce the mask before running the air compressor component of the machine. The air compressor can be noisy, and it may frighten your child at first. If your child is suffering from more severe symptoms, hold the mask fairly close to their face and then slowly move it closer until the mask is properly in place.

Delivering nebulizer doses properly

WARNING

Keep in mind that a *blow by* (holding the nebulizer facemask or mouthpiece several inches from your child's face and merely misting the medication) doesn't help your child because the medication doesn't effectively enter their airways, which is where they need the medicine. To properly deliver your child's medications, the nebulizer must work as a closed system, with the mask fitting snugly on their face, covering both the nose and mouth.

TIP

As with many other situations that involve very young children, you can use music, appropriate toys, a special cartoon or other types of entertainment available on your mobile device as a helpful distraction for your little one. If all else fails, remain firm and steady, and make sure your child receives the necessary medicine. Even the smallest infants ultimately discover that nebulizer treatments make them feel better. Eventually, that realization makes the time you spend administering nebulizer therapy more effective, comfortable, and rewarding for both you and your child.

Treating toddlers (ages 2 to 5 years): Medication challenges

Few medications are available in the United States for children ages 2 to 5 years. The U.S. Food and Drug Administration (FDA) has approved the use of montelukast (Singulair), a leukotriene modifier (see Chapter 13), in a 4-milligram chewable tablet, for use in this age group. However, inhaled corticosteroids and long-acting inhaled beta$_2$-adrenergic (beta$_2$-agonist) bronchodilators (or nonsedating antihistamines for allergic rhinitis) aren't specifically formulated for children under 4. Therefore, nebulizer use can be extremely important during the toddler and preschool years (see Figure 15-1).

AUTHOR SAYS

The lack of specific medications for children under age 4 is a serious concern for doctors and parents. This age group has experienced the highest increases in asthma rates in recent years, yet is the last group to receive attention in the development of new asthma medications.

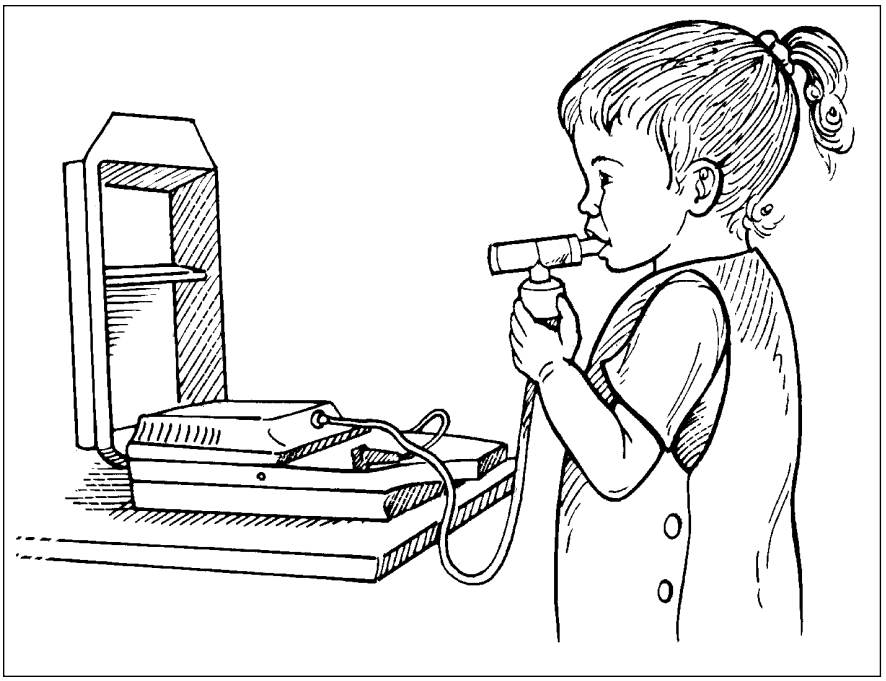

FIGURE 15-1: Young child using a nebulizer.

Fortunately, the U.S. Congress has established a program of incentives to encourage pharmaceutical manufacturers to conduct clinical trials of medications, including those for asthma, in the pediatric age group. In fact, FDA regulations require pharmaceutical companies to submit detailed plans for studying formulations specifically for children (for example, syrups and chewable tablets) when seeking approval for the development of new drugs. The hope is that this program can lead to improved medical treatments for young children with asthma and other allergic diseases.

Because very few effective asthma medications have gone through the drug development process for FDA approval for use with children under 4 years of age, many doctors prescribe drugs that haven't been studied extensively for use in that age group. Therefore, determining the appropriate dosages of asthma medications for toddlers can prove challenging. Children react differently to medications than adults do, and determining the correct dosage for children isn't as simple as assuming a toddler receives half of an adult dose.

GETTING KIDS INTO CLINICAL TRIALS

Conducting clinical trials with young children — especially those younger than 4 — is very costly and time-consuming compared to clinical trials involving children older than 12 and adults. Because of the great need for pediatric patient participation, make a commitment to enroll your asthmatic infant or toddler in clinical trials. Doing so can help researchers develop new and better medications that benefit all children. In addition, you can discover a great deal about asthma and its management, and you and your child may love all the extra attention while participating in these studies. The medicines being tested are free, and patients are reimbursed for their time and travel while participating in a clinical trial.

Pharmaceutical companies also need to make a commitment to conduct trials for younger children. These trials may cost more and prove difficult, but the lives and health of young children depend on such studies.

Peak-flow meters and school-age children (ages 5 to 12)

By the time children are 5 years old, they can generally use a peak-flow meter at home. This device allows you and your doctor to assess the state of your child's lungs. Using a peak-flow meter each morning and night can help you and your child manage their asthma in the following ways:

- Educating both you and your child about what type of treatment works and which triggers may cause problems
- Enabling you to discuss your child's condition in terms of specific criteria, thus enhancing communication between you and your child's doctor
- Providing an objective way of tracking your child's response to their asthma medications
- Warning you and your child that an asthma episode is looming

Establishing your child's personal best peak-flow rate enables you and your child to tell when problems occur, because you can note when the rate goes down according to the green, yellow, and red zones of the peak-flow zone system. For more information on using peak-flow meters, turn to Chapter 5.

Using inhalers: Teens and asthma

Many teens with asthma feel different and insecure because of their disease. Unfortunately, adolescent anxieties about fitting in and being cool can result in teen asthmatics ignoring or not properly managing their disease. In some cases, adolescents may even allow their symptoms to worsen rather than simply taking a whiff or two from their inhaler.

TIP

To avoid these types of potentially dangerous asthmatic situations, allow your teenager a voice in the management of their asthma. Depending on the severity of their asthma, your teenager and their doctor can work together to develop a plan for adjusting medication therapy to control symptoms, thus avoiding serious episodes that may seem especially embarrassing for a teen. Some asthma medications last 12 hours (see Chapter 12); therefore your adolescent can use them at home in the morning and the evening, minimizing the need to be seen using medication while at school.

AUTHOR SAYS

Your child may also benefit from participating in a support group with other teenage asthmatics. Encourage open and honest discussions with your child about their condition to ensure that they feel better informed and more respected. Being involved in setting goals for therapy, developing a treatment plan, and reviewing its effectiveness can also help teenagers build a positive self-image, increase personal responsibility, and gain problem-solving skills, thus making them more likely to make better decisions about managing their condition.

Handling Asthma at School and Day Care

If your child has asthma, inform teachers, administrators, and the school nurse about your child's condition. Some schools and day care centers institute asthma management programs that provide the following:

- Policies and procedures for administering students' medications
- Specific actions for staff members to perform within the program

  These actions may include establishing clear policies on taking medications during school hours, designating one person on the school staff to maintain each student's asthma plan, and generally working with parents, teachers, and the school nurse (if one is available) to provide the most support possible for students with asthma, especially so they can have access to medications they may need while at school.

TIP

- An action plan for treating students' asthma episodes

  Regardless of whether the school or day care center administers such a program, take the following steps to ensure that your child's school days are as healthy, safe, and fulfilling as possible:

  - Meet with school staff to inform them about any medications your child may need to take while on campus, as well as any physical activity restrictions your doctor may advise. (Properly managing their condition allows most children with asthma to participate in sports and physical education [PE] classes.)
  - File treatment authorization forms with the school office and discuss what school personnel must do if your child suffers an asthma emergency. Also, provide instructions on how to reach you and your child's physician during an emergency.
  - Inform school personnel of allergens and irritants that can trigger your child's asthma symptoms, such as pets in the classroom, and request that the school remove the sources of those triggers, if possible.

WARNING

Make sure your child understands that everyone's asthma is different and asthma medications shouldn't be shared. Exchanging asthma medications with other kids can cause dangerous problems because individual prescriptions vary according to the severity of each child's asthma and other factors. Don't let children use each other's inhalers, because doing so can spread potential infections, such as colds and flu. Chapters 13 and 14 contain specific information about controller (long-term) and rescue (short-term) asthma medications.

Indoor air quality at school and day care

From about the age of 2, most children spend the majority of their waking hours at school or day care. Therefore, ensuring that these environments are as free of potential asthma triggers as possible is essential to your child's health.

TECHNICAL STUFF

According to the U.S. Environmental Protection Agency, recent studies indicate that indoor pollutant levels can often be two to five times higher than outdoor levels, and occasionally as much as 100 times higher. Irritants and allergens that can affect your child at school often include the following:

- Outdoor smoke, soot, chemicals, pollens, and mold spores
- Animal dander from a furry classroom pet

- Indoor mold from ventilation ducts as well as indoor irritants such as tobacco smoke, scents from printers and copiers, and fumes from heating, ventilation, and air-conditioning systems

TIP

Asthma symptoms related to poor indoor air quality (IAQ) may resemble symptoms that you typically associate with colds, allergic rhinitis, fatigue, or flu. For this reason, you may not realize that your child's asthma suffers as a consequence of poor IAQ at school or day care. However, the following tips may provide clues that can help you decide whether IAQ is a factor:

- Many students, teachers, administrators, and other personnel experience similar symptoms.
- Your child's symptoms (and those of other affected people) improve or disappear after school or day care.
- Symptoms begin to appear rapidly following physical changes, such as construction work, painting, or pesticide use at the school or day care.
- Your child and other people with allergies or asthma experience symptoms only when they're inside the building.

TIP

If you think your child may experience symptoms related to poor IAQ at school or day care, contact an appropriate staff member. Your child's school (or school system) may have an IAQ coordinator or health and safety coordinator on staff to respond to your concerns.

Participating in PE: Exercise and asthma

AUTHOR SAYS

Living with asthma doesn't mean that your child needs to sit on the sidelines. Participating in PE and other opportunities for exercise is vital for a child's development, regardless of whether they have asthma. Nonetheless, make sure that the school's PE instructors are aware of your child's condition and that they know what to do if an asthma episode develops.

WARNING

PE instructors and coaches should encourage your asthmatic child to participate actively in sports, but they must also be aware of and respect your child's limitations. Extended periods of running and any exercise that takes place in cold, dry air appear to trigger asthma flare-ups, known as exercise-induced bronchospasms or exercise-induced asthma (EIA). Exercise is one of the most common precipitants of asthma symptoms that many doctors see in clinical practice. More than 90 percent of patients identify physical exertion as a major cause of their asthma symptoms. Although EIA can develop at any age and occurs equally among

adults and children, it's a much bigger problem in kids because they typically engage in more physical activity than many adults do. (See Chapter 9 for more information on EIA.)

Your child's doctor may prescribe medications to control and prevent EIA, as well as recommend appropriate warm-up and cool-down activities that can reduce the risk of EIA. Having an action plan in place prior to an emergency can ensure that your child receives the proper treatment when they need it most. Part of that plan should include providing immediate access to your child's rescue drug in case it's needed to treat the onset of any acute respiratory symptoms.

As long as your child sticks to their asthma management plan, the disease shouldn't prevent them from enjoying or even excelling at a wide range of physical activities. Just look at Olympic gold medalist Jackie Joyner-Kersee, football player Jerome Bettis, soccer star David Beckham, and other top athletes with asthma.

IN THIS CHAPTER

- Controlling asthma while you're pregnant
- Maintaining healthy lung functions for you and your baby

Chapter 16
Pregnancy and Asthma

If you have asthma and you're pregnant or considering pregnancy, we have some good news for you: With appropriate care, the vast majority of pregnant people with asthma have uncomplicated pregnancies.

MYTH BUSTER

Although treatment issues related to asthma affect approximately 4 percent of all pregnancies in the United States, very few of these cases involve situations that imperil either the parent or the child. However, the potential for serious asthma-related complications exists if you don't control your asthma during pregnancy.

Therefore, continuing treatment for your disease — under your doctor's supervision — with an appropriate and effective asthma management plan is vital to

- Avert sudden aggravations of your asthma symptoms, thus minimizing the need for emergency care and hospitalizations
- Maintain as close to normal lung function as possible
- Prevent chronic and troublesome symptoms of asthma, such as coughing, shortness of breath, and wheezing — especially upon awakening in the morning and episodes that disturb your sleep at night
- Provide the most effective medication therapy that results in minimal or no adverse side effects
- Sustain near-normal levels of exercise and other physical activities
- Give birth to a healthy, beautiful baby

AUTHOR SAYS

In spite of what some people may think, most people with asthma go through pregnancy and labor well. Although it may have happened somewhere, most practicing allergists have never seen labor or delivery set off a severe asthma attack.

In this chapter, we address the special issues concerning asthma during pregnancy. We will review the basics of managing asthma while you are pregnant and how to avoid asthma triggers, allergens, and irritants. In addition, we discuss managing nasal conditions associated with pregnancy and the appropriate medications to take while pregnant.

Identifying Special Issues with Asthma during Pregnancy

Although one-third of pregnant patients don't experience any change in asthma severity levels during pregnancy, another third suffer from more severe asthma. For the remaining third, their condition may actually improve. In most cases, asthma severity returns to prepregnancy levels by the third month after delivery. Your asthma's severity can vary from one pregnancy to another, and neither you nor your doctor can predict how pregnancy may affect your condition.

Your hormones and your asthma

For some people, pregnancy seems to trigger asthma symptoms. In fact, you may not realize that you have asthma until it shows up during your pregnancy because the significant hormonal changes your body experiences during pregnancy may cause increased airway congestion. Your body's hormonal changes can also induce or aggravate allergic and nonallergic rhinitis and *sinusitis* (sinus infections) during pregnancy. These conditions can, in turn, increase your asthma's severity.

REMEMBER

You also need to address allergies and related conditions when you're expecting a child. If you have *allergic rhinitis* (hay fever) or *allergic conjunctivitis* (red, itchy eyes), both of which affect many people with allergic asthma, work with your doctor to control those symptoms while you're pregnant.

The basics of managing asthma while pregnant

The first step in avoiding asthma-related complications during your pregnancy is to make sure your doctor properly diagnoses your respiratory symptoms. (See Chapter 1 for more information.)

SEE YOUR DOCTOR

If the diagnosis reveals that you have asthma, your doctor should help you develop an effective asthma management plan. This plan should consist of specific avoidance strategies, medications, monitoring, and assessment measures. Your management plan should also provide steps to take in case your asthma symptoms suddenly worsen.

TIP

Make sure you (and your doctors) integrate your asthma management plan and any treatment you may receive from an asthma specialist (such as an allergist or pulmonologist) with obstetric care from your obstetrician, family doctor, or primary care physician. A team approach by your physicians helps eliminate the risk of different doctors prescribing different treatments that can, in combination, produce adverse side effects for you and your baby. Integrated treatment can also ensure more effective control of any other condition or complications besides asthma and related disorders you may experience during pregnancy.

Breathing for Two

MYTH BUSTER

During your pregnancy, you're not only eating for two but also breathing for two — yourself and your baby. Contrary to what some people believe, the greatest danger to your unborn child isn't the preventive (or *controller*) medication your doctor prescribes to help manage your asthma, but rather the adverse effects that oxygen deprivation can have on your baby if you suffer severe or repeated asthma episodes during pregnancy.

REMEMBER

To help you avoid adverse effects during your pregnancy, your asthma management plan needs to lay out how you can

- **Assess your condition with appropriate pulmonary function tests.** With these tests, you can establish benchmark results against which your doctor can compare later tests to determine your condition's severity.
- **Avoid or at least minimize exposure to allergens or irritants that may cause asthma flare-ups.** In many cases, effective avoidance measures can reduce the possibility of asthma episodes that require you to take additional medications, especially the frequent need for rescue (or *quick-relief*) drugs.
- **Treat your condition with appropriate preventive medications to ensure that you adequately maintain your lung function and your baby receives a sufficient supply of oxygen.** Preventive medications can also minimize the possibility of asthma episodes that may require emergency treatment or drugs.

TIP

MOTHER NATURE'S MILK

Breastfeeding provides nutritional, immunologic, and psychological benefits for your newborn child. Breast milk, in contrast to cow's milk in infant formulas, may decrease the potential for allergic sensitization by reducing your baby's exposure to ingested food allergens. In addition, breast milk may reduce the incidence of bronchiolitis and infection-induced asthma (see Chapter 15) during infancy because the baby receives antibodies against viral infections through Mother Nature's milk.

Avoiding asthma triggers, allergens, and irritants during pregnancy

REMEMBER

During your pregnancy, avoid precipitating factors that may trigger asthma episodes. See Chapter 6 for extensive details on asthma triggers and precipitating factors.

If you suffer from allergic asthma, implement (under your doctor's supervision) an avoidance and allergy-proofing plan that limits your exposure to inhalant allergens as well as airborne irritants, especially tobacco smoke. A comprehensive avoidance strategy can also help alleviate symptoms of allergic rhinitis and allergic conjunctivitis. Effective allergy-proofing focuses on your home in general and your bedroom in particular. We provide extensive information and tips on allergy-proofing in Chapter 7.

Undergoing allergy testing and immunotherapy during pregnancy

WARNING

If you're already receiving *immunotherapy* (allergy shots) when you become pregnant, your doctor may advise you to continue with the treatment because, in many cases, it can help prevent allergy attacks that may make your asthma worse. Stopping immunotherapy may result in your symptoms worsening, thus requiring additional medication therapy. Frequently, your doctor may advise reduced doses of immunotherapy to minimize potential risks of allergy-shot reactions.

If you're already pregnant and considering allergy testing to determine which allergens trigger your symptoms, or if you're thinking about starting immunotherapy, your doctor will probably advise you to wait until after your baby is born.

Managing nasal conditions associated with pregnancy

Pregnant people often experience worsening of their preexisting rhinitis or develop certain nasal and upper respiratory symptoms for the first time. As with the changes in asthma severity levels that we explain in "Your hormones and your asthma," earlier in this chapter, in many cases these increased or newly acquired nasal symptoms result from hormonal changes that occur only during pregnancy.

Poorly managing these nasal conditions can complicate your asthma and, in severe cases, interfere with your sleeping, eating, emotional well-being, and overall quality of life. Contending with the unpleasantness of impaired sleep, sneezing, runny nose, itchy eyes, inflamed sinuses, ear infections, and sinus headaches while pregnant is a challenge you (and your family) want to avoid.

The following sections provide information and tips for managing the most common nasal conditions associated with pregnancy.

Allergic rhinitis (Hay fever)

If avoidance and allergy-proofing don't provide sufficient control of your hay fever symptoms, your doctor may advise using nasal cromolyn spray (see Chapter 13). However, you should avoid using oral decongestants during the first trimester of your pregnancy.

Many people treat hay fever symptoms with over-the-counter (OTC) antihistamines. But during your pregnancy, check with your doctor before taking any medications, including OTC products. In many cases, particularly with antihistamines, second-generation products such as Allegra, Zyrtec, and Claritin (available OTC) are safer and cause less drowsiness than many of the first-generation antihistamines. In addition, OTC NasalCrom is considered a safe nasal spray for treating allergic rhinitis during pregnancy. However, budesonide, a nasal corticosteroid spray is very effective and also safe to use during pregnancy.

Vasomotor rhinitis of pregnancy

Vasomotor rhinitis of pregnancy is a nonallergic upper respiratory syndrome that usually develops only during pregnancy, mostly from the second month to term. The associated symptoms of nasal congestion, nasal dryness, and nosebleeds usually disappear after delivery.

TIP

Buffered saline nose sprays can provide effective relief for vasomotor rhinitis of pregnancy. Exercise can even sometimes help relieve this condition. The most effective treatment, however, is using budesonide nasal corticosteroid spray, as mentioned in the previous section.

Sinusitis

The incidence of sinusitis in pregnant people is higher than in the rest of the population, possibly because pregnancy hormones cause the lining of the sinuses to swell. These often painful sinus infections can develop as complications of rhinitis and viral upper respiratory infections, such as the common cold. Sinusitis can trigger asthma symptoms and, in some cases, may complicate your asthma to the point that it doesn't respond to treatment. Poorly managed sinusitis can worsen to the point where sinus surgery becomes necessary.

TIP

To reduce the risk of sinus infections, your doctor may recommend using a nasal douche cup, nasal bulb syringe, or other type of nasal wash device at home to irrigate your nostrils with warm saline solution, relieving pressure and congestion in your nasal passages. Ask your doctor for specific instructions on using these devices.

If your doctor prescribes medication to clear a sinus infection, amoxicillin is probably the first choice, unless you're allergic to penicillin. If you're allergic to penicillin, your doctor may prescribe some type of erythromycin-based medication.

Exercising with asthma during pregnancy

Most people with asthma experience some degree of exercise-induced asthma, or EIA (see Chapter 9), particularly as a result of activities that involve breathing cold, dry air (such as running outdoors). Consult with your doctor to evaluate what level and type of exercise benefits you most during your pregnancy.

SEE YOUR DOCTOR

Activities that allow you to breathe warmer, humidified air (such as swimming in a heated pool) may be less likely to trigger EIA symptoms. In order to lessen the occurrence of EIA episodes, ask your doctor about medications that can help control airway inflammation when you exercise and prevent symptoms of this condition. (See Chapters 12 and 14 for information on these products.)

With proper treatment and management, asthma doesn't have to keep you from enjoying your regular physical activities during pregnancy.

Assessing your asthma during pregnancy

In addition to closely monitoring your lung function through office spirometry (see Chapter 3 for an explanation of this process), your doctor may advise you to measure your airflow at home using a portable peak-flow meter to assess your peak expiratory flow rate (PEFR).

Although PEFR measurements alone generally don't provide complete information to fully evaluate your asthma's severity, they certainly can provide valuable insight into the daily course of your asthma. (We provide detailed instructions on using peak-flow meters in Chapter 5.)

Monitoring your baby's condition

During the beginning of your second trimester, your doctor may use an ultrasound to establish a benchmark for assessing your baby's growth. If your asthma is moderate or severe, your doctor may advise further ultrasound scans during your third trimester.

During the third trimester, your doctor should assess your baby weekly. However, if your doctor suspects problems, they may need to check the baby's well-being more often. Your doctor should encourage you to record the baby's activity, or do *kick counts,* daily.

During labor, your doctor needs to closely monitor the baby. In most cases, doctors follow the baby's progress through close electronic monitoring. Also, make sure that the staff measures your PEFR when you're first admitted to the hospital for labor and again every 12 hours until you deliver.

In rare cases, more intensive monitoring may be required for patients who enter labor with severe or uncontrolled asthma. Doctors may use continuous electronic monitoring of the baby's heart rate or relatively frequent *auscultation* (listening through a stethoscope to the baby's heart rate).

Taking asthma medications while pregnant

In general, you should continue your course of asthma medications throughout your pregnancy, labor, and delivery. The specific medication plan your doctor prescribes depends on your asthma's severity.

The primary goal of pharmacological asthma management during pregnancy is to use the minimum level of medication necessary — with minimal risk of adverse side effects — to control the underlying airway inflammation.

The preferred medications for treatment of pregnant people with asthma are

- Inhaled products that deliver the drug directly to your airway in higher, and thus more effective, concentrations than oral medications. Inhaled drugs also reduce the risk of systemic side effects. To find out more about asthma medications, their use, and their side effects, turn to Chapters 12, 13, and 14.
- Drugs, such as cromolyn (Intal), that have a long history of safe use during pregnancy and have been studied extensively in published clinical trials. Budesonide is also considered a safe inhaled medication for treatment of asthma during pregnancy.

The drugs your doctor prescribes to safely control your asthma during pregnancy may include the following:

- An inhaled beta$_2$-adrenergic (beta$_2$-agonist) bronchodilator to use in case your asthma symptoms suddenly worsen, or preventively as needed prior to exercise.

  For mild asthma, occasionally using inhaled beta$_2$-adrenergics usually suffices for asthma control. In some cases, your doctor may also recommend regularly using inhaled cromolyn (Intal).
- A regimen of constant preventive doses of inhaled corticosteroids, sometimes in combination with a long-acting bronchodilator.

  However, in more severe cases, you may require short bursts of oral prednisone if a combination of bronchodilators and inhaled corticosteroids fails to keep your asthma symptoms under control.

  Managing severe persistent asthma may require higher doses of inhaled corticosteroids, often in combination with long-acting bronchodilators. Maintaining this aggressive regimen usually allows your doctor to minimize your use of oral corticosteroids.

  WARNING

  In rare cases of uncontrolled asthma during pregnancy, you may require an alternate-day or single daily morning dose of oral corticosteroids to reestablish control of your symptoms. Make sure that an asthma specialist, in consultation with an obstetrician who specializes in high-risk pregnancies, monitors this course of medication. As soon as your symptoms are under control, your doctors should taper off the dosage of oral corticosteroids and gradually replace them with your regular use of inhaled corticosteroids to reduce the risk of adverse side effects to you or your baby.

Handling asthma emergencies while pregnant

SEE YOUR DOCTOR

Your doctor should instruct you on how to recognize the signs and symptoms of worsening asthma and how to treat these episodes early with appropriate medications. Also, make sure that you can tell when a deteriorating situation may require emergency medical attention, and know what you need to do if that happens. (See Chapter 5 for more information.)

TIP

The most important points to keep in mind when dealing with an asthma emergency during pregnancy are

- If you're exposed to any allergens or irritants (especially tobacco smoke), get away from those allergy triggers as quickly as possible. Otherwise, your condition may deteriorate.
- Even if you have days when you're feeling better, don't stop taking your preventive medications during your pregnancy, unless your doctor instructs otherwise.

WARNING

- If your symptoms worsen, don't resort to overusing your short-acting beta$_2$-adrenergic inhaler as a single agent. Doing so probably won't improve your condition and may even make matters worse.
- If your condition doesn't improve rapidly after one or two doses of your short-acting beta$_2$-adrenergic inhaler or if your condition continues to deteriorate, seek appropriate medical care, as detailed in your asthma management plan.

IN THIS CHAPTER

- Seeking an accurate diagnosis of your condition
- Avoiding adverse drug interactions and side effects

Chapter 17
Asthma and Older Adults

People are living longer than ever before, especially in developed countries, such as the United States, Canada, and most European Union member nations. However, increased life spans have been paralleled by an unfortunate rise in the incidence of asthma among people older than 65 worldwide.

REMEMBER

For older people, dealing with asthma can present unique challenges for the following reasons:

- Many older patients are first diagnosed with asthma only after their respiratory symptoms have become increasingly severe and their health, as a result, has deteriorated.
- Older people with asthma are more likely to be hospitalized and have a higher incidence of fatalities than younger patients. This is most likely due to the fact that heart disease and COPD are commonly associated with this older age group.
- The process of adjusting to life with asthma can be more complex for an older person than for a younger person, because in many cases, older patients have multiple medical problems.
- In many cases, asthma management plans for older people are more intricate than those for younger patients and may require more frequent medication adjustments due to potential adverse interactions with drugs that many older patients take for other medical conditions, such as heart disease, high blood pressure, or diabetes (see "Watching out for adverse side effects," later in this chapter). Older patients may take many drugs, some of which may adversely affect their asthma or may interact with their asthma medications.

In this chapter, we discuss how to recognize asthma in older adults and the characteristic features of late-onset adult asthma. We also review why developing an asthma medication plan is vital, and we explain which delivery systems are the most effective for treating asthma in this population. Lastly, we discuss appropriate pharmacotherapy for people older than 65 and explain how to avoid potential adverse side effects of those medications.

Recognizing Asthma Later in Life

MYTH BUSTER

Asthma once had a reputation for being a disease that primarily affected children and young adults. A common misconception about asthma was that it was a "kid's disease." However, as we explain throughout the book, your respiratory symptoms may vary widely and may first appear at any age over your lifetime.

REMEMBER

In fact, the incidence of asthma among people older than 65 in the United States is second only to that found in children under 18 (which is mostly *extrinsic* or *allergic* asthma). Recent studies show that the condition can develop later in life, which explains why some doctors use the term *late-onset adult asthma* (*intrinsic* or *nonallergic* asthma) to describe the ailment.

Keep these important facts in mind:

- Many older patients with late-onset adult asthma aren't diagnosed until their condition has deteriorated because they initially assume their respiratory symptoms are due to a greater susceptibility to colds and bronchial infections later in life. Wheezing can also be a symptom of other underlying conditions, such as heart failure or vocal cord dysfunction.
- Allergic conditions that frequently coexist with asthma in younger patients, such as *allergic rhinitis* (hay fever; see Chapter 10) and *atopic dermatitis* (eczema; see Chapter 8), aren't present as often in older patients, which can further increase the challenge of correctly diagnosing asthma in seniors.
- Late-onset adult asthma affects older women to a greater degree than older men. Studies indicate that hormonal changes during menopause may account for this disparity.
- Some older people are at increased risk for severe, even fatal, asthma attacks because they don't perceive a worsening of their respiratory symptoms, such as shortness of breath or chest tightness, and thus fail to use prescribed quick-relief medications or seek medical help in time.

WARNING

SEE YOUR DOCTOR

» Older people with asthma should properly monitor their lung function with peak-flow meters (see Chapter 5) to assess their condition accurately and objectively. Lung function tests should be part of any checkups and medical exams.

Taking Asthma Medications When You're Older

Just in case the previous section seemed to raise some serious concerns, the good news is that many older people with asthma show remarkable improvement in their respiratory condition when they're treated with appropriate asthma medications. The challenge in some cases may be to find the best combination of therapies to achieve the desired result.

REMEMBER

Because asthma often coexists with chronic bronchitis in older patients, your doctor may prescribe a one- to two-week trial therapy with oral corticosteroids to determine the extent of improvement from spirometry (see Chapter 13) before prescribing appropriate and effective long-term asthma medications.

Your asthma management plan may include a mix of short-term and long-term medications. Your doctor may periodically adjust and refine this multiple-drug therapy based on how well you respond to the treatment and what types of medications you're taking for other medical conditions. If you take a variety of prescribed medications, make sure you keep an accurate medication record (see Chapter 3) to reduce the risk of potential adverse interactions between certain drugs. It's advisable to bring an updated list of all the medications you are taking to every doctor's visit.

Using more effective delivery devices

As part of your asthma *pharmacotherapy* (treatment with medications), your physician may prescribe a breath-activated metered-dose inhaler (MDI), such as ProAir RespiClick, as a short-term rescue medication, and possibly a dry-powder inhaler, such as Advair Diskus, as a long-term controller medication (see Chapter 12).

TIP

These types of newer inhalation devices are usually easier to operate properly and deliver medication to the airways more effectively than older generic MDIs, which some seniors find challenging to use. Incorrectly using an older generic MDI can lead to ineffective administration of the medication, eventually resulting in poor asthma control and worsening of respiratory symptoms.

Watching out for adverse side effects

WARNING

Although pharmacotherapy is a vital aspect of effective asthma treatment in nearly all cases, older patients need to understand that they can be at an increased risk for potential adverse side effects from asthma medications for the following reasons:

- As you age, your response to the use of bronchodilators may change, and you may experience increased sensitivities to adverse side effects of beta$_2$-adrenergic medications, including tremors and a rapid heart rate. If you have cardiovascular disease, your doctor may consider prescribing a combination inhaler containing a beta$_2$-adrenergic medication (a short-acting bronchodilator) with an anticholinergic (for example, Combivent; see Chapter 14) as an alternative to additional doses of only beta$_2$-adrenergics.
- High-dose inhaled corticosteroid use may predispose patients to cataract formation in the eyes and can reduce the bone mineral content in some asthma patients (particularly people older than 65) who may have preexisting *osteoporosis* (a decrease in bone mass) or a sedentary (inactive) lifestyle. If this concern pertains to you, your doctor may recommend calcium supplements, vitamin D, and (for women) estrogen-replacement therapy.
- Male patients should inform their doctor of any type of past or current prostate condition before taking any anticholinergic medications, such as ipratropium bromide (Atrovent), because these drugs may aggravate a preexisting prostate problem.
- People who use beta-blockers are potentially at risk for worsening of asthma due to the blocking activity of these drugs, which prevents beta$_2$-adrenergic medications from relieving bronchospasms. In addition, many older people take aspirin daily to prevent heart problems and can have idiosyncratic adverse drug interactions (occurring rarely and unpredictably) to aspirin and nonsteroidal anti-inflammatory drugs (NSAIDS) taken to relieve arthritis. For more information on drug sensitivities and adverse drug reactions that can affect your asthma, see Chapter 6.
- Some older patients who may have impaired liver or kidney function may require a reduced dose of aspirin or NSAIDS to prevent accumulation of these drugs in the bloodstream, which can lead to potential side effects. In addition, drug interactions with asthma medications that can cause problems in older patients include some commonly prescribed antibiotics (erythromycin) and cimetidine (Tagamet). Always make sure your doctor is aware of any liver or kidney conditions that may be affecting you, especially if you take aspirin or NSAIDS.

IN THIS CHAPTER

- Understanding asthma-COPD overlap syndrome
- Describing the three features of aspirin-exacerbated respiratory disease
- Differentiating vocal cord dysfunction from asthma
- Coping with viral illnesses
- Managing asthma symptoms with obesity or occupational asthma

Chapter 18
Looking At Other Asthma Concerns

In the 21st century, we've discovered a great deal more about the different types of asthma and the many factors involved in this complex disease. We've come a long way in our understanding of the relationship and differences between asthma and chronic obstructive pulmonary disease (COPD). The more we learn, the more complex the interactions appear to be. New approaches to treatment are coming to light, and factors that affect patients, such as the use of aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs), are better understood. Proper and accurate diagnosis is becoming even more important, and we must never forget that all that wheezes is not asthma.

With so many young competitive athletes complaining of respiratory symptoms, it's important that we consider vocal cord dysfunction in the evaluation of these individuals. Also, we must be aware of the role of viruses in triggering asthma symptoms, especially after coming through several years of battling COVID-19 during the largest viral pandemic of the last 100 years.

In the United States, we are living through another epidemic: obesity. This condition has a profound effect on the frequency and severity of asthma and needs to be part of the treatment plan. In addition, occupational exposures should be considered in the history of anyone with respiratory symptoms.

In this chapter, we cover these issues so you have a better understanding of their relationships to other asthma concerns.

Asthma-COPD Overlap Syndrome

Asthma-COPD overlap syndrome (ACOS) describes the condition in which a patient has clinical features of both asthma and COPD. Asthma is an inflammatory disease that affects both the large and small airways, and is usually first seen during childhood and often associated with allergies. After an asthma attack, lung function values return to normal. COPD, like asthma, is an inflammatory disease that focuses mainly on the small airways. Patients with COPD usually are symptomatic after age 40, and this form of airway obstruction is often progressive, caused most often by cigarette smoking and passive exposure to tobacco smoke.

The type of airway inflammation seen in asthma is different from the inflammation in COPD. Eosinophilic inflammation (caused by eosinophils, which are specific white blood cells) is most characteristic of asthma, whereas COPD is most often associated with neutrophilic inflammation (caused by neutrophils, which are other white blood cells). In older patients, it may be difficult for doctors to differentiate asthma from COPD because irreversible airway obstruction can develop over several years in some patients with asthma and some patients with COPD may have reversible airway obstruction that resembles asthma.

ACOS is estimated to occur in about 30 percent of patients with obstructive airway disease. The prevalence increases as patients get older. People with a diagnosis of ACOS tend to have more respiratory symptoms than individuals with asthma or COPD alone. They also have more severe attacks, leading to more emergency room visits and hospitalizations.

ACOS can't be treated with only one medicine, and treatment may involve three medications instead of two. These medications include an inhaled corticosteroid, an inhaled long-acting bronchodilator, and an anticholinergic (see Chapters 13 and 14 for more on these types of medications). Doctors also may prescribe one of the newer biologic agents (see Chapter 13). Annual pneumonia and flu vaccinations and pulmonary rehabilitation are recommended for patients with ACOS.

TIP

If you smoke and you have asthma, COPD, or both, it's critical that you stop smoking. Find out about smoking cessation programs in your area or online. If you're experiencing symptoms of coughing, wheezing, and shortness of breath, don't diagnose yourself. Go see an allergist, who can make a proper diagnosis and set you on the right treatment course.

Aspirin-Exacerbated Respiratory Disease

More than 1 million people in the United States live with aspirin-exacerbated respiratory disease (AERD), also known as *Samter's Triad*. In Europe, this condition is commonly called NSAID-exacerbated respiratory disease, or NERD.

AERD is a chronic medical condition that consists of these three features:

- **Asthma:** AERD affects only a small percentage of people with asthma.
- **Nasal polyps:** Polyps, caused by poorly managed sinus disease, often reoccur even after surgery.
- **Sensitivity to aspirin and NSAIDs:** The NSAIDs people with AERD don't tolerate include ibuprofen and naproxen.

AERD is a late-onset condition that doesn't appear until patients are in their 30s or 40s and is rarely seen in children. It occurs more frequently among men, but is usually more severe in women.

Signs of AERD usually include both upper respiratory symptoms (increased nasal congestion, frontal headache or sinus pain, and sneezing) and lower respiratory symptoms (cough, wheezing, and chest tightness), but the condition can also induce skin flushing, rash, abdominal pain, and occasionally vomiting.

WARNING

About 75 percent of people with AERD develop mild-to-moderate respiratory reactions when they drink alcohol. These reactions are not always specific to just one type of alcohol and often occur after consuming less than one glass of alcohol.

No specific lab test to diagnose AERD exists, and in the absence of a strong history of sensitivity to aspirin or NSAIDs, an oral aspirin challenge (an oral desensitization process described in the following paragraph) may be done in a healthcare setting to confirm the diagnosis.

Although there's no cure for AERD, treatment options include avoiding aspirin and NSAIDs; taking medications, including biologics, to control asthma and nasal polyps; and undergoing a desensitization process for aspirin in your physician's office in which you're given gradually increasing doses of aspirin every few hours over a single day or a couple of days to build up your tolerance. This desensitization may decrease the need for oral corticosteroids (such as prednisone) to prevent the recurrence of nasal polyps.

Vocal Cord Dysfunction

TECHNICAL STUFF

The vocal cords normally open to allow air to move into the lungs. However, with *vocal cord dysfunction* (VCD), the vocal cords spontaneously close when the person breathes in, cutting off their air supply. This results in coughing, wheezing, and shortness of breath when the patient inhales that isn't responsive to asthma medications such albuterol or inhaled corticosteroids. Unfortunately, many patients with VCD are misdiagnosed with asthma, but because VCD isn't a respiratory condition, inhalers don't help alleviate the symptoms.

One way of differentiating between asthma and VCD is to listen to the sounds the patient makes when they breathe. People with VCD tend to produce a noisy inhale, known as *stridor*, whereas asthma patients often wheeze when they exhale.

VCD is triggered by exercise, and young competitive athletes are often affected. Interestingly, young women are three times more likely to suffer from VCD as young men. Some patients occasionally have VCD along with other conditions such as asthma or acid reflux.

SEE YOUR DOCTOR

Medication isn't recommended for treatment of VCD. In fact, the appropriate approach to preventing and treating this condition is a referral to a speech therapist who can recommend breathing techniques to relax the vocal cords. The good news is that VCD is a treatable condition, and patients can regain control of their breathing.

Viral Illnesses

Viral respiratory infections are associated with close to 80 percent of asthma attacks in both children and adults. Some evidence shows that *rhinovirus infections* (upper respiratory infections, usually referred to as the common cold) that cause wheezing in infants can be a major risk factor for developing asthma later in

childhood. In infants, *respiratory syncytial virus* (RSV) infections have symptoms similar to an acute asthma attack: wheezing, rapid breathing, and inflammation of the small airways. About one-third of children with bronchiolitis due to RSV infection will continue to have episodes of wheezing that may result in the development of asthma, especially if they have a family history of asthma. When the COVID-19 pandemic started in 2020, many healthcare providers were concerned about its effect on asthma patients. It turns out that contrary to expectations, people with well-controlled asthma were not at greater risk of getting COVID-19 than the general population or developing severe disease from COVID-19 infection. Similar to prevention of viral influenza infections, vaccination, treatment (anti-viral medications), and proper hygiene techniques provide the greatest protection from COVID-19 for asthma patients. However, patients with severe asthma have been found to be at an increased risk of developing long COVID. See Chapter 6 for more about the relationship between viral illnesses and asthma.

Obesity and Asthma

According to the Centers for Disease Control and Prevention, 38 percent of adults in the United States are *obese,* defined as having a body mass index, or BMI, of 30 or more (the normal BMI range is 18.5–24.9, and overweight is 25–29.9). Obesity isn't just a problem for adults, of course; it's also a problem for children: Around 21 percent of kids in the United States between the ages of 12 and 19 are also dealing with obesity.

Understanding how obesity affects people with asthma

People with a BMI of 30 or more have a much higher risk of having asthma than those with a lower BMI. Seven percent of adults with a BMI in the normal range have asthma, but 11 percent of adults with a BMI classified as obese have asthma. For reasons we don't yet understand, this seems to be a particular problem for women — nearly 15 percent of females who are obese have asthma.

It's not entirely clear why carrying extra weight can cause asthma. Certainly, extra fat tissue around the chest and abdomen may constrict the lungs and make it more difficult to breathe. It's probably a lot more complicated than that, though. Fat tissue produces inflammatory cytokines (proteins that are involved with the immune system), which may affect the lungs. Several studies have suggested that obese patients suffer worse symptoms and are less able to control their asthma than patients who maintain a healthy weight range.

Controlling your weight to improve asthma control

People with both obesity and asthma often have other medical problems that may affect their asthma. People with a BMI over 30 tend to have depression more often than leaner people, and depression is associated with worse asthma symptoms. Another medical condition that's more common in overweight or obese people is *obstructive sleep apnea* (repeated interruption of breathing during sleep). People with obstructive sleep apnea and asthma also appear to have more severe asthma symptoms than people with asthma who don't have obstructive sleep apnea.

Obese asthma patients often use more medications, suffer worse symptoms, and are less able to control their asthma than patients in a healthy weight range. Extra weight increases the risk of having asthma as well as having more severe, difficult-to-control asthma. So, what's the solution? Although losing weight can be hard for anybody and may be particularly challenging if asthma makes it difficult to exercise, it's possible to drop those extra pounds, and your doctor can connect you with resources to help you control your weight.

Occupational Asthma

Occupational asthma has become the most common work-related lung disease in developed countries. However, the exact number of newly diagnosed cases of asthma in adults due to occupational exposure is unknown. Up to 15 percent of asthma cases in the United States may be job-related. Occupational asthma is caused by inhaling fumes, gases, dust, or other potentially harmful substances while on the job. Often, your symptoms are worse during the days or nights you work, improve when you have time off, and start again when you go back to work.

If you have occupational asthma, you may have been healthy most of your life, and this is the first time you've had asthma symptoms, or you may have had asthma as a child, and now it has returned. If you already have asthma, it may be worsened by being exposed to certain substances at work. For more on triggers and treatments of occupational asthma, see Chapter 6.

Understanding how occupational asthma develops

People with a family history of allergies are more likely to develop occupational asthma, particularly to substances such as flour, animal proteins, and latex. But

even if you don't have a family history of allergies, you can still develop this disease if you're exposed to conditions that induce it. Also, if you smoke, you're at greater risk of developing occupational asthma.

Veterinarians, people who work with fish, and animal handlers in laboratories can develop allergic reactions to animal proteins. Healthcare workers can develop asthma after breathing in powdered proteins from latex gloves or from mixing powdered medications. Similarly, about 5 percent of people working with laboratory animals or with powdered natural rubber latex gloves have developed occupational asthma.

Occupational asthma can also occur in workers after repeated exposure to small chemical molecules in the air, such as paint hardeners or components of plastics and resins. For example, *isocyanates* are chemicals that are widely used in many industries, including spray painting, insulation installation, and manufacturing of plastics, rubber, and foam. These chemicals can cause occupational asthma in up to 10 percent of exposed workers.

Knowing potential triggers of occupational asthma

The length of time you are exposed to a substance before it triggers your asthma varies. It can be months or years before symptoms occur. On the other hand, exposure to a high concentration of irritants can cause asthma within 24 hours. Fortunately, occupational asthma is frequently a reversible condition if you can avoid the exposure. However, prolonged unprotected exposure has the potential to result in permanent changes to your lungs.

Inhaling some substances in aerosol form can directly lead to the buildup of naturally occurring chemicals in your body, such as histamine or acetylcholine in your lungs, which leads to asthma. For example, insecticides used in agricultural work can cause a buildup of acetylcholine, which causes your airway muscles to contract and tighten.

The following occupations are most associated with occupational asthma:

- Workers in the petroleum and chemical industry because of exposure to hydrochloric acid and sulfur dioxide
- Veterinarians and animal handlers because of exposure to animal proteins

- Millers and bakers because of exposure to grains and flours
- Cotton and textile workers because of exposure to dusts from cotton and other textiles
- Painters and installers because of exposure to isocyanates
- Healthcare workers because of exposure to powdered proteins from latex gloves

An allergist is the best qualified physician to determine the cause of your symptoms. Once the cause of your symptoms is identified, you and your employer can work together to ensure that you avoid exposure to the substance that triggers your asthma symptoms and to high concentrations of irritants.

5 Finding Support and Speaking Up

IN THIS PART . . .

Advocate for yourself and others with asthma.

Improve communications with your healthcare team.

Use trusted resources for further help in dealing with asthma.

IN THIS CHAPTER

- Understanding the importance of self-advocacy
- Enhancing communication with your asthma specialist
- Increasing awareness of asthma issues

Chapter 19
Patient Advocacy for Yourself and Others

If you have asthma, being aware of your symptoms and the challenges of living with your condition makes you the best person to advocate for your own appropriate medical care. One of the best ways of becoming a better advocate for your medical treatment, or for treatment of someone with asthma that you're caring for, is by knowing how to effectively communicate with your physician.

With that in mind, in this chapter we offer some tips to help you improve your self-advocacy skills and get the most out of your doctor visits.

Improving Your Doctor Visits

Many things can happen in your busy life between medical appointments, and it can be difficult to remember all the issues you've dealt with since you last saw your physician. The following strategies can help you more effectively work with your doctor to achieve better management of your asthma.

Keeping an asthma journal

TIP

Maintaining a journal can prove very helpful in keeping track of asthma-related events that have occurred since your last doctor visit. Each time you experience asthma symptoms, note them in your journal, including the date and time they occurred. Also record what you think triggered your flare-ups and what you did to relieve your symptoms. Many people also write down their daily peak-flow readings so they can share them with their asthma specialist.

AUTHOR SAYS

Most importantly, take your journal to all your medical appointments and review the entries with your physician to gain the best picture of your clinical condition. This review will help your doctor better determine if changes need to be made to your asthma treatment regimen.

Making a list

TIP

Patients often want to discuss specific issues with their physician but find that their mind just goes blank when they finally have an appointment with the doctor. You can avoid this situation by keeping a running list of things you want to discuss in your asthma journal so you can refer to it during your office visit.

We recommend including the following items on your list:

- **Discussing new medications that may be appropriate for your condition.** For example, can your asthma specialist tell you more about biologics (see Chapter 13) and whether they may be right for you?
- **Sharing changes in your symptoms.** For example, if you sometimes experience palpitations, discuss that issue with your asthma specialist so they can determine if those symptoms are due to side effects of your medications or possibly some other underlying cause.
- **Exploring possible causes of changes in your sleep habits.** For example, if your spouse complains that you snore, which may be due to sleep apnea, does your physician think a sleep study is needed, or is another approach recommended?

These are just a few examples of issues to be addressed at medical appointments. You will have your own specific concerns, of course, which you'll record in your asthma journal.

Asking questions

TIP

Making a list can certainly help you get your questions answered, although other questions may come up during your conversation in the doctor's office. Try to get answers to all your queries during the visit, because unanswered questions often lead to unnecessary stress and worry. Getting answers straight from your physician is preferable to doing an internet search, which may turn up inaccurate information.

Very often, a physician may anticipate your questions (for example, how long do I have to stay on this asthma medication?) and can answer them before you even have a chance to ask. Sometimes, though, you may still have unanswered questions at the end of an appointment. That's a good time to let your doctor know that you have remaining questions. Your doctor should then take the time to address your concerns.

Recording your doctor's appointments

TIP

When you're seeing a new doctor, especially one who uses unfamiliar medical terminology, it can be very helpful to record the entire conversation — with the doctor's approval, of course. Recording your visit allows you to listen to the discussion later and pause it as needed to make notes and look up unfamiliar terms, thus avoiding confusion about what your doctor meant. Eventually, you may even be able to assist friends and family members who record their office visits and help them understand what their doctor was saying.

Taking a friend with you

AUTHOR SAYS

Another strategy that can improve your visits with the doctor is to take a good friend, loved one, adult child, or other relative with you to your appointments. Your friend can take notes while you and the doctor are talking about your treatment. Your companion can also act as a reassuring presence in case you're anxious about the visit.

REMEMBER

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) is a federal law that protects sensitive patient health information from being disclosed without the patient's consent or knowledge. However, this privacy rule specifically permits a physician to share information that is directly relevant to the participation of a friend who is identified by the patient to be involved in the patient's care.

If you'd like your friend to bring up topics or ask questions during the appointment, it's advisable to write them down ahead of time so you'll be on the same page, both literally and figuratively. It is a good idea to check with and get permission from the doctor's office to bring a friend before showing up for your appointment at the office.

Advocating for Better Asthma Treatment

Besides improving your self-advocacy skills and getting the most out of your doctor visits, you can advocate for others. Because so many people, including some of our elected leaders, have limited knowledge of the adverse ways in which asthma and allergies — and other medical conditions — affect so much of the U.S. population, we need individuals and organizations to help further the following goals:

- Policies for better medical treatments for asthma and allergies
- Improved Medicare and Medicaid benefits
- Access to high-quality health care
- Research toward achieving a cure for these conditions

Getting the word out

In order to enhance the lives of everyone affected by asthma, it's vital to improve the diagnostic process, develop effective asthma education, and increase funding of needed medical research. The following asthma action items can serve as a guide for getting involved at the level that's comfortable for you:

- Raising awareness with posts about asthma and allergies on platforms such as Facebook and Instagram.
- Following and linking to social media pages of organizations such as the Allergy & Asthma Network.
- Visiting with municipal, county, state, and federal officials and representatives at their local offices.
- Writing to the editors of local newspapers about asthma and allergies.

- Joining local chapters of asthma advocacy organizations to help fundraise and participate in events that raise awareness of the condition, such as walks, runs, and other activities. You might enjoy helping in these endeavors and have a lot of fun.
- Starting a patient, family, or caregiver support group in your area.

Keeping your eyes on the prize

Making your voice heard is the primary goal. You can write your own letters, emails, and texts or easily use editable templates from organizations that advocate for asthma patients, such as the Allergy & Asthma Network, to get the message to policymakers that patient care needs to be a nationwide priority. Chapter 20 provides a list of these organizations and their websites.

By working together with dedicated organizations such as Asthma & Allergy Network and raising awareness of your concerns as a patient or caregiver, you can help ensure that important issues concerning asthma and allergies remain at the forefront of our national healthcare agenda.

IN THIS CHAPTER

- Discovering organizations that help people with asthma
- Understanding which resources can be helpful in specific circumstances

Chapter 20
Turning to Trusted Resources

In this chapter, we introduce you to several invaluable resources (listed alphabetically) for those living with asthma. Web addresses, as well as brief descriptions of the information available on each website, are provided.

AUTHOR SAYS

If none of the resources we've listed address your questions or concerns, simply pull up your favorite search engine and type in the key words related to your area of interest. You're bound to find something helpful; if not, contact Allergy & Asthma Network for assistance (for more on AAN, see the section later in this chapter). Someone in that organization will be able to help you.

Allergy & Asthma Network

The mission of AAN (`https://allergyasthmanetwork.org`) is to end the needless suffering and death caused by asthma, allergies, and related conditions. Highlights of the organization's work include the following:

- **Outreach:** AAN has a volunteer network that provides support to patients, an award-winning magazine, a series of patient guides written to help you better

manage your condition, and resources to support you, including an Asthma Storylines app, and resources to help you afford your medications.

- **Education:** The network provides printed and digital resources to give patients access to guidelines-based information, monthly webinars with allergy and asthma experts, continuing education for healthcare professionals, and tools to help you work with your healthcare provider to make the best decisions for your life.
- **Advocacy:** AAN empowers stakeholders to impact public policy and get involved in advocating for asthma and allergy issues with their elected officials. Each year, the network leads the way for an impactful advocacy day on Capitol Hill in Washington, D.C., where patients and healthcare providers come together to visit their legislators and make their voices heard.
- **Research:** AAN's multidisciplinary community takes on qualitative market research, working with focus groups to support scientific drug development. They connect people with clinical trials and work to have patients' voices heard in all aspects of allergy and respiratory care.

American Academy of Allergy, Asthma & Immunology

As a leading organization representing more than 7,000 allergists and immunologists, the American Academy of Allergy, Asthma & Immunology, or AAAAI (`https://aaaai.org`), is a premier resource for patients with allergies, asthma, and immune deficiency disorders. AAAAI's website includes comprehensive condition guides that provide expert information on allergies, asthma, and other immunologic disorders. The site's Tools for the Public section features the following resources to help allergy and asthma patients:

- **Find an Allergist/Immunologist:** The search options on this page can enable you to locate an allergist or immunologist near you.
- **Check Your Symptoms:** The Virtual Allergist tool can provide valuable information about your allergy and asthma symptoms.
- **Check Pollen Counts:** AAAAI's National Allergy Bureau on this page can provide accurate mold and pollen levels.

- **Provides important education links:** The Drug Guide; Conditions Library; Research Summary; Allergy, Asthma and Immunology Glossary; and School Tools (to help keep children with allergic disease safe in school) pages address educational topics of particular concern to people with asthma.

American College of Allergy, Asthma & Immunology

The more than 6,000 allergist/immunologists and allied healthcare professionals who are members of the American College of Allergy, Asthma & Immunology (ACAAI) work collaboratively to further the common goals of patient care, education, advocacy, and research. ACAAI's website (`https://acaai.org`) features resources such as the following:

- **Ask the Allergist:** Here, you find answers to common questions about allergies.
- **Patient Support Organizations:** This is a comprehensive listing of groups that help patients with allergies and asthma.
- **Need an Allergist?:** This page describes what an allergist treats, reasons to see an allergist, and how to choose an allergist.

TIP

For questions about COVID-19, visit `https://acaai.org/resource/covid-19-asthma-and-allergies/`. Here, you get expert information about the ways COVID-19 may affect your condition, as well as vaccination recommendations and additional related resources.

American Lung Association

Founded by volunteers in 1904 to combat the scourge of tuberculosis, the American Lung Association (`www.lung.org/`) now provides important asthma resources, public outreach, and support programs.

On the ALA website you can find helpful information on the basics of asthma and easy-to-download asthma action plan templates (which you should complete with your physician) for home and school. The website also offers a section that allows you to join asthma support groups. Other links on the ALA website provide information and resources related to living better with asthma.

American Thoracic Society

Founded in 1905 as the American Sanatorium Association, the organization changed its name to the American Thoracic Society (ATS) in 1960. With a membership of more than 16,000 physicians, research scientists, nurses, and other allied healthcare professionals, the ATS promotes global respiratory health through multidisciplinary collaboration, education, and advocacy. The four main pillars of the society are

- Leading scientific discovery
- Transforming patient care
- Impacting global health
- Advancing professional development

The ATS website (`https://thoracic.org/`) features a Patient Resources page that includes highly informative fact sheets on asthma and its treatment.

Asthma and Allergy Foundation of America

Asthma and Allergy Foundation of America, or AAFA (`https://aafa.org/`), a not-for-profit organization founded in 1953, is the leading patient organization for people with asthma and allergies, and the oldest asthma and allergy patient group in the world.

The foundation offers a variety of educational programs, resources, and tools for patients, caregivers, and healthcare professionals. AAFA launches awareness campaigns throughout the year, teaching the public about asthma and allergic diseases.

Caregiver Action Network

Caregiver Action Network, or CAN (`https://caregiveraction.org/`), is a nonprofit organization providing education, peer support, and resources to family caregivers across the United States free of charge. As the nation's leading family

caregiver organization, CAN works to improve the quality of life for the more than 90 million Americans who care for loved ones with chronic conditions, disabilities, diseases, or the frailties of old age.

CAN serves a broad spectrum of family caregivers, ranging from the parents of children with significant health needs, to the families and friends of wounded soldiers, and even to adult children caring for parents with Alzheimer's disease.

CHEST Foundation

The mission of the CHEST Foundation (`https://foundation.chestnet.org/`) is to champion lung health by supporting clinical research, community service, and patient education. Among the foundation's resources are

- **Lung Health A-Z:** This web page provides patients with comprehensive information on nearly every topic related to lung health.
- **COVID-19 Resources:** This page features educational materials and videos to support the most at-risk populations, at `https://foundation.chestnet.org/lung-health-a-z/covid-19-resources/`.
- **Important funding:** The foundation gives out grants for clinical research programs and distributes funding for community service projects.

Global Allergy & Airways Patient Platform

Global Allergy & Airways Patient Platform, or GAAPP (`https://gaapp.org`), is a vibrant worldwide not-for-profit organization with 94 constituent members from every continent who share information and best practices. GAAPP is a patient-focused organization that also works with medical professionals, researchers and scientists, governments, and companies in the healthcare industry to empower people with allergies, asthma and atopic diseases. Its mission is to help patients and their families throughout their journey with asthma, allergies, and atopic diseases through awareness, education, advocacy, and research.

Global Initiative for Asthma

Global Initiative for Asthma (GINA) was established in 1993 in collaboration with the U.S. government's National Heart, Lung, and Blood Institute; the National Institutes of Health, and the World Health Organization. GINA's programs and strategies for asthma care are developed by leading asthma experts and patient representatives from around the world. Its objectives are to enhance awareness of asthma, improve management of asthma, and expand access to effective asthma therapy throughout the world.

Some of the ways that GINA is working to improve the lives of people with asthma globally include

- Reviewing asthma management literature from the around the world, which is constantly being updated, to distill and reflect the most current information on treating and managing asthma
- Developing the GINA global strategy for asthma management and prevention, which are presented on the website
- Providing patient resources and educational tools to assist in the diagnosis and treatment of asthma
- Organizing World Asthma Day each year in May to promote the development and implementation of effective asthma management programs throughout the world

MedlinePlus

MedlinePlus (`https://medlineplus.gov/`) is a service of the National Library of Medicine, the world's largest medical library, which is part of the U.S. government's National Institutes of Health. The mission of MedlinePlus is to present high-quality, relevant health and wellness information that's trusted, easy to understand, and free of advertising in both English and Spanish without charge. The service doesn't endorse any companies or products. According to its own records, 418 million users viewed MedlinePlus more than 888 million times in 2021.

National Asthma Education and Prevention Program

The National Asthma Education and Prevention Program (nhlbi.nih.gov) is administered by the U.S. government's National Heart, Lung, and Blood Institute (part of the National Institutes of Health) and consists of representatives from the major scientific, professional, governmental, and voluntary organizations interested in asthma. The program was initiated to address the growing health problem of asthma in the United States. The goals of the NAEPP are to

- Raise awareness about asthma among patients, healthcare professionals, and the public
- Ensure effective control of asthma
- Enhance quality of life for patients with asthma
- Oversee the development of asthma guidelines and create tools and materials to put the guidelines in practice

National Jewish Health

Since 1899, when National Jewish Health (`https://nationaljewish.org/home`) began treating destitute tuberculosis patients in Denver, the hospital's mission has expanded into treatment and research of many respiratory, immunologic, and related disorders. As a teaching hospital, National Jewish is also a leading educator of healthcare professionals in clinical areas, including asthma and allergy.

The hospital's philanthropic mission is to provide a significant amount of free or heavily subsidized care to patients who are unable to afford total treatment costs.

NeedyMeds

This national nonprofit organization (`https://needymeds.org/`) connects people in the United States to programs that will help them afford their medications and other healthcare costs. According to the organization's mission statement, it seeks to educate and empower patients seeking affordable health care.

6 The Part of Tens

IN THIS PART . . .

Travel safely and sensibly with asthma.

Discover the truth about misleading and dangerous myths about asthma.

Maintain effective symptom control and avoid the September asthma peak.

Understand why influenza and COVID-19 vaccinations are vital for keeping your asthma well controlled.

IN THIS CHAPTER

- Making sensible travel plans
- Taking asthma and allergy medications and other essentials with you
- Dealing with asthma and allergy problems on the road
- Attending to children with asthma and allergies while traveling

Chapter 21

Ten Tips for Traveling with Asthma

If only airlines could lose your asthma the way they sometimes lose your baggage. Imagine if you could leave your wheezing instead of your heart in San Francisco. And wouldn't it be nice to wake up in the city that never sleeps because the Big Apple stirs you to the very core instead of waking to an asthma episode interrupting a good night's rest?

Of course, getting away from asthma isn't that easy. Extensive studies over the past 30 years show that this respiratory ailment is an ongoing condition you usually don't outgrow, although its symptoms can certainly vary in character and severity throughout your lifetime.

Think of asthma and other often related conditions, such as *allergic rhinitis* (hay fever), as constant companions. Wherever you may roam, these conditions will be along for the ride. Knowing how to control the symptoms of these ailments is vital to ensuring that no matter what else may go wrong during your travels, your respiratory condition won't complicate or ruin your plans.

Planning a Safe, Healthy Trip

REMEMBER

A key element in proper travel planning is avoiding places where you know pollens, dander, tobacco smoke, or other allergens and irritants may be prevalent and may, depending on your specific sensitivities, trigger your respiratory or allergy symptoms.

TIP

The following points are general guidelines for preventing problems frequently associated with these triggers:

- **Dander:** Beware of visiting or staying in homes with cats, dogs, and other animals, including rabbits, birds, gerbils, and other domesticated rodents. Even if the animal lover removes the pet from the area, you can still suffer an adverse reaction because of the residual dander or hair in the room. Horseback riding also may not be advisable. Before you saddle up for a dude ranch out West, make sure you can control any symptoms Trigger's horsehair may trigger. Consult your doctor about preventive medications (and see Chapters 5 and 7).

WARNING

- **Food allergens:** The foods that trigger allergic reactions most frequently in adults with food hypersensitivities include fish, shellfish, peanuts, and tree nuts. For children, the most common triggers are milk, eggs, peanuts, tree nuts, fish, soy, and wheat (see Chapter 8). Because of the swiftness and severity with which a food allergy reaction can strike (especially with peanuts), be vigilant in avoiding these triggers when traveling. If you or your child is sensitive to peanuts and you're planning to travel where these seemingly harmless legumes are a regular part of local cuisine (many parts of East Asia, for example), ask your doctor about additional precautions you can take. Although you can clearly identify peanuts in many dishes, they may be a hidden part of the cooking process itself in some cases (for example, foods cooked alongside dishes prepared with peanut products). When in doubt, avoid local fare in these parts of the world, rather than risking reactions such as an asthma attack, hives, or, worse yet, a potentially life-threatening case of anaphylaxis (see Chapter 8).
- **Ragweed:** Avoiding travel to the eastern half of the United States and Canada from mid-August through October is probably advisable (assuming you don't already live there) if you're sensitized to ragweed pollen. If you must travel to those areas during ragweed season, ask your physician about preventive medications you can take to keep your symptoms under control (see Chapter 10). Also, the National Allergy Bureau (NAB) of the American Academy of Allergy, Asthma & Immunology produces seasonal allergen maps that chart the prevalence of allergenic pollens, as well as several other allergens, around the country throughout the year. Check out the NAB website at `https://pollen.aaaai.org/#/` or call 414-272-6071. (See Chapter 7 for more information on pollens.)

Adjusting Treatment for Travel

Prevention is the key to a safe and trouble-free trip, which usually means consulting your physician ahead of time to evaluate your asthma management and make any advisable adjustments based on where and when you're going and what you'll be doing while traveling. You may need to adjust your medication because of increased exposures to triggers. In addition, remember that changes in time zones may affect the dosage schedule of some medications you're taking (for any ailment, not just asthma or allergies).

You also need to make sure you'll be able to stick with the program your physician advises. If possible, get a letter from your doctor summarizing your medical history, as well as the treatments and medications you're currently taking. If you're at risk of acute asthma or allergy attacks, ask your physician about wearing a medical alert pendant on your wrist or around your neck.

Taking Medications and Other Essentials

Make sure you have all your necessary medical supplies, devices, and prescriptions with you when traveling. If you're flying (or riding on a train or bus), pack these items in your carry-on bag. After you arrive at your destination, keep your essentials with you instead of leaving them in your hotel room (or other accommodations) when you're out and about. If you need to leave your medications in the room (for example, while using hotel recreational facilities), make sure you store these products in a secure location, such as the room safe or a locked suitcase, instead of leaving them out on the bathroom countertop.

Keep medications in their original containers and never mix pills of different types into one receptacle. By keeping them in their original containers, you have the proper dosage information readily available, which is especially important if someone else needs to administer your medication to you. Also, if you're traveling internationally, customs officials are generally less suspicious of pills and capsules in their original containers.

If you or your child uses a nebulizer at home, ask your doctor about taking one with you on your trip. If you're traveling overseas, don't forget to bring whatever adapters and converters (available online or in most luggage, electronics, and travel stores) you may need to use your domestic devices in different countries. The electric current in many other parts of the world is 220 volts rather than the 110 volts that's standard in the United States and Canada. If you have a portable nebulizer, don't forget extra batteries.

Getting Medications and Medical Help Abroad

Ask your doctor about special medical considerations for specific countries and areas. Some countries require that you get vaccinated for certain diseases before your visit. As for medications, don't assume that every place you visit has pharmacies stocked with the supplies you need. Write down both the brand names of your medications and their generic names. In a pinch, having both names available may allow a local pharmacist to find what you need.

When planning your trip, you may want to contact the International Association for Medical Assistance to Travelers (IAMAT), a voluntary organization based in Canada. The main page of IAMAT's website includes a Travel Health Resources tab that links to helpful resources. Visit `www.iamat.org` or contact the organization in the United States at 716-754-4883 for further information.

Also, if you're a U.S. citizen, the U.S. State Department's American Citizens Services can provide help in case of an emergency. Check the State Department's website, `www.state.gov`, or call their Hotline for American Travelers, 888-407-4747, before your departure to receive information on contacting U.S. embassies and consulates for assistance with medical matters.

Flying with Allergens and Irritants

Sad to say, but your fellow airplane passengers may make you sick. Studies show that airplane passenger cabins are some of the worst indoor dust mite and animal dander sites. Because airliners are tightly sealed environments that often lack adequate air filtering or cleaning, they can collect and concentrate sky-high quantities of allergens and irritants that hundreds, even thousands, of passengers constantly track in. So be advised: Your seat may already be occupied by frequent-flier allergens.

Many airline seats house thriving colonies of dust mites and their allergenic waste products. In addition, although all U.S., Canadian, and many European airlines ban smoking anywhere on the aircraft (and in most parts of airport terminals), smoking is still allowed on some international flights.

TIP

If exposure to tobacco smoke triggers your asthma symptoms, find out as much as possible about an air carrier's smoking policies. If your travel includes flying an airline that permits smoking, try to be seated as far away from the smoking section as possible.

AUTHOR SAYS

Take our advice when you're planning air travel:

- **Pack your medications in a carry-on bag.** That way, they're immediately available in the event of a serious asthma episode or allergic reaction or in case the airline loses your luggage. You don't want to find yourself in strange territory without your medications.
- **Stay hydrated during your flight.** Avoid alcohol and drink plenty of water. Not only does drinking water help minimize potential asthma and allergy problems, but it also can put a dent in whatever jet lag you may develop.
- **If you have the opportunity/financial ability, consider upgrading to first or business class.** If available, the leather seats may be less likely to harbor allergy triggers, and at the very least, you'll give yourself more breathing (and leg) room.

Considering Allergy Shots and Travel

SEE YOUR DOCTOR

We usually recommend transferring your immunotherapy (allergy shots) program to another location when you're traveling only if you'll be gone at least a month or more (if you're a snowbird from the North wintering in Southern California or South Florida, for example). If you'll be gone for a month or more, ask your physician for a referral to a doctor in the area where you'll be staying and have that physician administer your shots in a medical facility.

WARNING

Although practices vary in different areas of the United States and the world, don't give yourself allergy shots. The risk, although low, of a bad reaction or even anaphylactic shock means you need qualified medical personnel nearby, just in case (see Chapter 11).

When visiting the physician in the new location, bring your allergy serum (vaccine) vials in a refrigerated or ice-insulated pack, and make sure you have clear written dosage instructions from your doctor.

Reducing Trigger Exposures in Hotels and Motels

WARNING

Tobacco smoke and its lingering traces can cause problems, especially outside the United States or Canada, where hotels and other accommodations are less likely to restrict smoking. Wherever you stay, reserve a room on a smoke-free floor. Likewise, if hotel pillows pose a potential allergy problem for you, bring your own pillow and pillowcase (see Chapter 4).

Inspect the room before you occupy it, looking for signs of animal hair, dirty air vents, dust, or mold. If you find evidence suggesting that staying in the room will lead to breathing problems, ask for another room that appears safer and more comfortable. In some cases, your doctor may advise bringing along a portable HEPA air filter system (see Chapter 7). Check to see if your hotel offers allergy-free rooms, which may even come with HEPA filters and allergy covers on the mattresses. Also, you might consider staying at a hotel that is part of an organization that is completely cigarette smoke free throughout the entire property.

Avoiding Food Allergy Reactions during Your Trip

In your travels, you may come into contact with foods to which you have an allergy (not just an intolerance — see Chapter 8 for the difference between the two conditions). In some cases, the menu in a restaurant, hotel, or café reveals all you need to know about potentially problematic ingredients. But sometimes you need to ask a lot of questions about the cuisine and how it's prepared. Don't be rude, but definitely don't be shy.

As we explain in Chapter 8, you may need to do more than simply determine that a particular dish doesn't contain foods to which you're allergic. For example, in many restaurants, various dishes are prepared on the same grill. In this case, if you're allergic to shellfish, for instance, make sure the cooking surface and utensils used to prepare your food haven't been previously used to prepare shellfish. If they have, allergens from the shellfish may end up in your meal, potentially causing a distressful dining experience.

WARNING

If your food hypersensitivities put you at risk for anaphylaxis, wear a medical alert pendant or bracelet. Also ask your doctor about prescribing an epinephrine kit, such as an EpiPen (see Chapter 8), and be sure to carry the kit with you.

Finding Help in Case of Emergencies

AUTHOR SAYS

Although the local hospital probably isn't at the top of your sightseeing list, find out the location of the nearest medical facility equipped to treat you in case of a serious adverse allergic reaction or severe asthma episode. Knowing where the closest medical assistance is available can help ensure that you get effective treatment if you experience a life-threatening reaction.

Depending on your destination, you can easily obtain information about local hospitals from the organizations we list earlier in this chapter (see the section "Getting Medications and Medical Help Abroad"), your doctor, or your travel agent. In some cases, you may need to do more homework; however, your health and safety are worth the effort.

Traveling with Your Asthmatic Child

TIP

When you're traveling with a child who has asthma, many of the same considerations that adults must contend with also apply. These points include the following:

- **Pack two containers of all medications, and make sure you've labeled them properly.** Keep one container with you as a carry-on, and put the other in a purse, backpack, or briefcase.
- **Obtain a medical alert bracelet or necklace for your child to wear.** If you're not around, emergency medical personnel will immediately know what to do about your child's condition.
- **Show your child how to pack their asthma or allergy medications properly.** In addition to preparing your child for trips they may take without you, this lesson can help your youngster find out more about managing their condition appropriately.

ASTHMA CAMPS

Children with asthma can benefit from a special type of vacation experience. Several organizations, including the American Lung Association (ALA), sponsor children's asthma camps throughout the United States and Canada. If your child has asthma, consider sending them to one of these camps for a healthy, safe, educational, and fun nature-oriented vacation. Asthma camps generally offer one- or two-week programs that teach children how to recognize the signs of asthma and allergy triggers, use medications and inhaler devices properly, and understand the basics of asthma management. Visit the ALA's website, `https://www.lung.org` to request information regarding asthma camps in your geographic area.

SEE YOUR DOCTOR

- **Take at least two epinephrine kits (such as an EpiPen or EpiPen Jr. for children under 66 pounds) if your child is at risk for anaphylaxis to ensure that you always have one at hand.** Make sure you and your child (depending on the youngster's age) know how to use the kit. Knowing how to use the kit means you should receive instructions on the proper use of the injector in your doctor's office, rather than waiting for a potential emergency to figure it out.

WARNING

- **Ask questions about meals.** If your child has peanut allergies, be especially vigilant on airplanes (particularly with the contents of those appealingly packaged snack bags), where peanuts can be as common as delayed flights (see Chapter 8).

IN THIS CHAPTER

- Understanding how asthma shouldn't be confused with other ailments
- Dispelling myths about asthma medications
- Recognizing falsehoods about living with asthma

Chapter 22
Ten Myths About Asthma and Allergies

Asthma affects up to 10 percent of the population in the United States and is the most common chronic childhood disease. Asthma also leads to more than 2 million emergency room visits and more than 9 million doctor's appointments per year. In fact, costs associated with asthma, including treatment, medications, and lost productivity, add up to more than $80 billion each year.

The incidence of asthma is rising dramatically in the United States and across the globe, particularly in highly developed parts of the world. Many experts now consider asthma and allergies a global epidemic.

Unfortunately, myths about asthma and allergies (which we dispel in this chapter) often interfere with proper diagnosis and treatment. However, the plain, simple, and accurate medical truth is this: Although no cure yet exists for asthma and allergies, when you receive effective, appropriate care from your doctor and fully participate in your asthma management as a patient, you can lead a normal, active, and fulfilling life.

Asthma Is Contagious

As we explain in Chapter 1, asthma and allergies aren't infectious or contagious. You don't catch asthma or an allergy. You may inherit a genetic disposition to develop hypersensitivities that can eventually appear as asthma or allergies. This response is the result of a complex process, in which your immune system responds to allergens, leading to allergic reactions that often make asthma worse. These allergens that your immune system may respond to include animal dander, dust mites, molds, and pollens from certain grasses, weeds, and trees.

I Can't Exercise Because I Have Asthma

You don't have to sit on life's sidelines just because you have asthma, even though most asthma patients are susceptible to symptoms of exercise-induced asthma (EIA.) You can effectively manage EIA through appropriate use of medications your doctor prescribes and also by integrating a suitable warm-up and cool-down routine into your exercise regimen. Read Chapter 9 for more information about asthma and exercise.

I Just Have A Recurring Head Cold

Hay fever, also known medically as allergic rhinitis, is the most common allergic disease in the United States and often coexists with asthma (see Chapter 7). As many as 60 million Americans may suffer from some form of hay fever, including 10 to 30 percent of all adults and up to 40 percent of all children. Allergy symptoms can cause a lot of sneezing, runny noses, and itchy, watery eyes. The key differences between allergy symptoms and cold symptoms are that allergies do not cause fevers in contrast to colds, and the nasal discharge (mucus) due to allergy symptoms is clear. In colds that are caused by viruses, the nasal discharge is thick and yellowish/green. A proper medical diagnosis is needed.

Children Will Outgrow Asthma

The idea that all children "outgrow" their asthma is a dangerous myth, and withholding treatment in the hope that somehow your child's asthma will just go away is a misguided approach. Many children do have fewer problems and a decrease in

airway symptoms as they grow older, but early and aggressive treatment of asthma significantly contributes to a better outcome (see Chapter 15). Your child's sensitivities, however, may not entirely disappear, and the possibility exists that a lack of treatment can result in irreversible airway changes. Clear and compelling evidence shows that early diagnosis and treatment results in fewer asthma symptoms.

Asthma Is All in My Head

For many years, some people believed that psychological factors such as anxiety, emotional disorders, or stress caused asthma. Although these problems can aggravate asthma or allergies, they don't *cause* asthma or allergies. Asthma is clearly in your airways, not in your head. Forget the negative stereotypes of people with asthma or allergies as nerdy, weak, anxious types, forever coughing and blowing their noses. Asthma and allergies can affect anyone, from the captain of the chess team to the captain of the football team, as well as everyone in between.

The Only Asthma Medication I'll Ever Need Is a Quick-Relief Inhaler

Asthma is more than coughing, wheezing, shortness of breath, chest tightness, and other respiratory symptoms that may come and go. If you have persistent asthma, which is what most asthma patients have, some airway inflammation and hyperreactivity will always be present throughout your lifetime, even when you aren't experiencing obvious symptoms. As a result, an essential aspect of treating asthma is the regular preventive use of long-term control medications, also known as anti-inflammatory drugs or controller drugs, which your physician prescribes to manage your airway inflammation. (Read Chapter 13 for more on asthma medications.)

In addition, the most recent Global Initiative for Asthma (GINA) guidelines recommend that short-acting beta-agonists (known as SABAs) not be prescribed as a sole therapy because short-acting medications increase the risk of severe complications and death. Adding an inhaled corticosteroid (ICS) daily or as needed reduces this risk. GINA also recommends that doctors prescribe the lowest dose of ICS possible. Once symptoms are controlled, physicians should attempt to further reduce the dosage of corticosteroid that the patient is taking.

I Should Stop Taking All My Allergy and Asthma Medication While I'm Pregnant

If you have asthma and you're pregnant or considering pregnancy, the good news is that with appropriate care, most women with asthma have uncomplicated pregnancies. Treatment issues related to asthma affect less than 5 percent of all pregnancies in the United States, and very few of these cases involve situations that imperil either the mother or the child. However, the potential for serious asthma-related complications exists if you don't control your asthma during pregnancy. Together, you and your doctor can decide the most effective medication therapy that results in minimal or no adverse side effects. Check out Chapter 16 for information about pregnancy and asthma.

I Don't Need to Carry My Asthma and Allergy Medication with Me

Make sure you have all your necessary medical supplies, devices, and prescriptions with you when traveling. If you're flying or riding on a train or bus, keep these items in your carry-on bag. After you arrive at your destination, keep your essential items with you instead of leaving them in your hotel room (or other accommodations) when you're out and about. If you need to leave your medications in the room, make sure you store these products in a secure location, such as the room safe or in a locked suitcase, instead of leaving them out on the bathroom countertop.

Moving to Arizona Will Cure My Asthma and Allergies

Years ago, doctors told patients with asthma and allergies to move to Arizona because of the area's dry climate and sparse population. Over the years, plenty of folks have indeed moved to Arizona, and those new residents decided to spruce up the desert scenery with non-native ornamental plants, such as mulberry trees. Mulberry trees thrive in the hot, dry climate and produce clouds of allergenic pollen. As a result, Phoenix and other cities in the state are now major allergy centers. In fact, some of the busiest allergists in the United States practice in Arizona.

I Just Have to Live with My Condition

With effective, appropriate care from your doctor and your own motivated participation as a patient, your asthma management plan can enable you to lead a full and active life. However, if properly following your asthma management plan still doesn't allow you to participate fully in the activities and pursuits that matter to you, openly communicate your concerns to your physician so your plan can be adjusted to maximize the effectiveness of your treatment. You may also want to consider requesting a referral to an asthma specialist. You should expect to effectively control your asthma, and your doctor should certainly help you achieve this goal. Read more about living well with asthma in Chapter 4.

IN THIS CHAPTER

- Understanding why asthma symptoms often increase in September
- Maintaining asthma control year-round
- Understanding why flu and COVID-19 vaccinations are vital

Chapter 23

Ten Ways to Avoid the September Asthma Peak

In many ways, September is a month of transitions. It marks the end of summer and the start of fall. The weather may cool and humidity levels in some regions may drop, but ragweed is in abundance. September is also when flu and cold viruses tend to emerge just as millions of children start school and adults get back to work. Many people are then exposed to the following risk factors that can trigger allergies and lead to asthma attacks:

- **Dander:** Children start spending more time indoors, either in school or at home doing homework. They may be exposed to allergens such as mold, pet dander, dust mites, and cockroaches, which can cause allergic reactions (see Chapter 6).
- **Outdoor allergens:** Ragweed and mold spores are potent allergens that emerge in early August and stick around until the first frost (see Chapter 7).
- **Irritants:** Diesel exhaust from school buses can linger in the air outside schools. It can also enter classrooms through open windows (see Chapter 4 for more on smoke and irritants).

- **Exercise-induced asthma:** Physical activity can trigger respiratory symptoms in September, especially when exercising outdoors during pollen season (see Chapter 9).
- **Viral respiratory infections:** Cases of colds, flu, and sinus infections rise in September. Likewise, the COVID-19 virus and its variants are considered highly contagious. People with moderate to severe asthma are at high risk for more severe complications if they are diagnosed with COVID-19 (see Chapter 6).
- **Stress:** New grades, new classrooms, new teachers, and increased homework can raise children's anxiety levels and make asthma worse (see Chapter 15).
- **Irregular medication use:** During summer, some children may not follow their asthma medication schedule. As a result, those children may be more at risk for asthma flares in September when they're exposed to more allergens and triggers (see Chapter 15).
- **Cold air:** In many parts of the United States, the weather cools in September. Some children may experience a rise in symptoms due to cold air or sudden changes in temperature (see Chapter 4).
- **Strong smells:** Teachers and classmates may wear scented products such as perfume, cologne, or hair products. Some teachers may use air fresheners (including the plug-in kind) in their classrooms, and cleaning products used in schools can also contain chemicals and scents. Exposure to any of these odors can trigger asthma attacks in sensitized children and adults (see Chapter 4).
- **Tobacco smoke:** Cigarettes are frequent asthma triggers, whether through smoking or via secondhand smoke that intensifies once the weather cools and people spend more time indoors (see Chapter 6).

REMEMBER

Preparation is the key to staying healthy. Review your asthma management plan. This individualized plan of prevention and treatment lays out what to do if symptoms arise. Many schools require that such a plan be kept on file for kids with asthma (see Chapter 5 for more information on developing an asthma management plan, managing asthma long term and knowing the levels of asthma severity).

In this chapter, we suggest techniques for guarding yourself from the worst that September has to offer.

Schedule an Asthma Checkup Before the School Year Begins

A routine asthma checkup for yourself or your child with asthma will help you better assess and understand what may be needed during the September asthma peak. Have lung functions changed? Is your or your child's asthma well controlled? Do medications need to be stepped up or stepped down? Make sure you or your child is using an inhaler correctly and get refills for the new school year. (See Chapter 15 for more information on asthma and children.)

Make Sure All Asthma Medications Are Refilled Prior to September

It's vital to make sure that quick-relief and controller medications haven't expired. It's also important to have quick-relief medications for home and for school. You may need to request additional prescriptions if your child spends weekends with other family members or plays sports and needs to keep medication in their gym bag. (See Chapter 9 for more details on this topic.)

Take Long-Acting Medications as Prescribed

Long-acting medicines prescribed by your doctor or your child's doctor are vital for controlling asthma. Don't take a summer vacation from your long-acting medications unless instructed to do so. (See Chapter 13 for information on asthma controller drugs.)

Always Carry Your Medications

When symptoms arise, it's critical to have access to your quick-relief inhaler. Be sure it hasn't expired and check the dose counter to make sure the inhaler still has active medication inside. It's important to always carry your medication with you, because you may not be able to predict when symptoms will worsen. (See Chapter 4 for more on this subject.)

Have a Peak-Flow Meter with You

A *peak-flow meter*, which is a device that alerts you to brewing lung function problems, may help you recognize when asthma symptoms are worsening. The key is using the peak-flow meter correctly to know your personal best and current readings. Ask your doctor if this tool is right for you or your child to help manage asthma. (See Chapter 5 for peak-flow meter information.)

Practice Good Hygiene

Good hygiene and handwashing have been shown to reduce the risks of a catching cold or virus that can make your asthma symptoms worsen. In fact, during the COVID-19 pandemic, asthma attacks went down significantly due to social distancing, handwashing, and mask wearing (see Chapter 6 for information on COVID-19 and asthma).

Identify and Avoid Asthma Triggers

Especially if you or your child has allergic asthma, you should do your best to avoid triggers. If pollen is a problem for your child, talk with teachers about having them stay inside instead of engaging in outdoor activities when pollen counts are high.

Late summer and fall are often the height of grass and weed pollen seasons. Outdoor exposures during those periods can make asthma symptoms worsen. If you need to be outdoors at those times, wearing a mask may help reduce exposure. (See Chapter 6 for trigger details.)

Get Vaccinated against Flu and COVID-19

Flu and COVID-19 infections can worsen your asthma symptoms. To prevent infections from these viruses and the resulting respiratory symptoms, we recommended that everyone with asthma get flu and COVID-19 vaccinations. These vaccinations can greatly reduce your risks of infection, which will significantly improve your ability to keep your asthma well controlled. (See Chapter 6.)

Follow Your Asthma Management Plan

REMEMBER

Your asthma management plan is a set of written individualized instructions that show you the steps to take to keep your asthma from getting worse. It provides guidance for when to step up medication or when to seek emergency care (see Chapter 5). This plan should be updated at your annual asthma review with your doctor. If your child has asthma, you should share the plan with the school nurse and your child's teacher (see Chapter 15).

Maintain Good Asthma Control throughout the Entire Year

Good asthma control means doing what you want to do with no limitations due to asthma symptoms. If you take your controller medication properly and limit exposures to triggers, you should be able to achieve good asthma control. If you are using your quick-relief medication more than two times per week for symptom relief or limiting your activity due to asthma, then it's time to speak to your healthcare provider.

REMEMBER

Never take a summer break from your controller medication as it will raise the chances of a September asthma attack. Even if you're exposed to fewer triggers during summer, don't reduce the use of your controller medication unless your doctor recommends that you do so (see Chapter 5).

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About the Authors

William E. Berger, MD, MBA, received his medical degree from the University of Cincinnati College of Medicine in 1973. He then completed an internship and residency program in pediatrics at UCLA Medical Center in 1976. Dr. Berger pursued additional training at National Jewish Hospital and Research Center, where he served as a fellow in allergy and immunology from 1976 to 1978. Board-certified in both pediatrics and allergy and immunology, Dr. Berger founded Allergy and Asthma Associates of Southern California in 1981 in Mission Viejo, California, where he treated both adult and pediatric allergy patients.

In 1995, Dr. Berger established Southern California Research Center, focusing on respiratory and allergy clinical research projects. To further his educational goals, in 1997, Dr. Berger received his master's degree in business administration from the Graduate School of Management at University of California, Irvine. He held dual appointments as clinical professor at the College of Medicine, Department of Pediatrics, Division of Allergy and Immunology, and adjunct professor of Health Care Management in the Graduate School of Management at University of California, Irvine.

Dr. Berger has served as president of the Orange County and California Societies of Allergy, Asthma, and Immunology. He has also been a member of the Joint Task Force on Practice Parameters, chairperson of the Managed Care Committee of the American College of Allergy, Asthma & Immunology, and chairperson of the Mission Hospital Institutional Review Board. He is a past president of the American College of Allergy, Asthma & Immunology, a professional organization that represents more than 6,000 allergy and asthma specialists throughout the United States and from many other countries. A former television medical correspondent for the Orange County Newschannel, Dr. Berger is the author of many academic papers and news articles in the field of allergy, asthma, and immunology.

Dr. Berger is the proud father of son Michael and daughter Johanna, and "Grandpa" to his loving grandchildren, Tyler, Brenna, Shane, and Nevada. He and his wife, Charlette, love to travel and enjoy playing a round of golf in their free time.

Tonya A. Winders, MBA, received her undergraduate degree from Louisiana State University in Shreveport in 1994 before obtaining her master's degree in marketing and business administration from Louisiana State University in Baton Rouge in 1996. She is currently taking classes toward a master's in global public health.

Tonya spent the first 15 years of her career in health care serving in sales, marketing, and leadership roles in the pharmaceutical, diagnostics, and medical device industries. From 2013 to 2022, she led the Allergy & Asthma Network (AAN), a national patient advocacy organization dedicated to ending needless suffering and death due to asthma, allergies, and related conditions through outreach, education,

advocacy, and research. In her time with AAN, the organization grew considerably in size as well as influence. Tonya served as a national media spokesperson and won numerous awards for her innovative approaches to programming.

In 2017, she was elected to serve as the president of the Global Allergy & Airways Patient Platform, which is an umbrella organization comprising more than 90 patient advocacy groups in immunology and respiratory fields throughout the world. She continues in this role today and also serves on the boards for the American Respiratory Care Foundation and the Alliance to Prevent Legionnaire's Disease.

Tonya has coauthored more than 50 peer-reviewed publications and serves as the patient voice in global guidelines for asthma and COPD. She is a frequent speaker at medical conferences in the United States and abroad.

Tonya's favorite role is serving as an advocate for her family and others living with allergies, asthma, eczema, urticaria, COPD, and more. She enjoys spending time with her husband of 26 years, Brian; her adult children, Kaleb, Jordan, Kaylee, Hunter, Karis, Katelyn, and Karson; and grandchild, Brentlee Scott.

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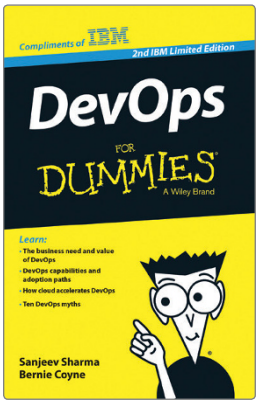

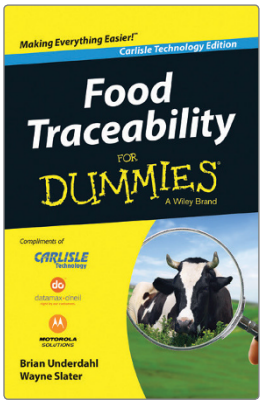

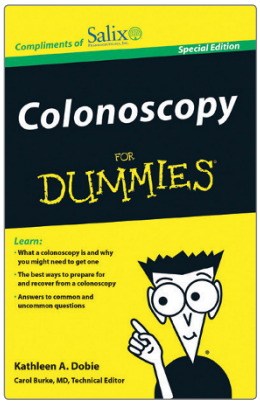

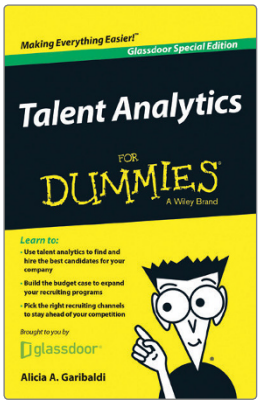

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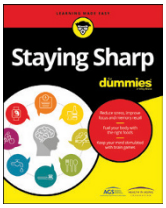

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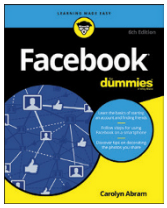

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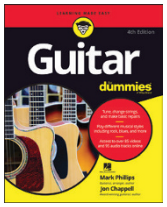

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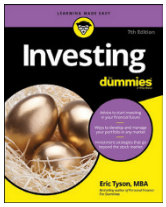

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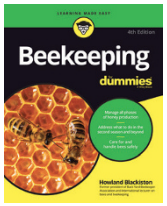

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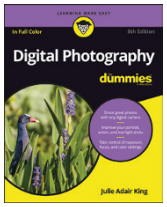

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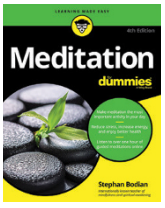

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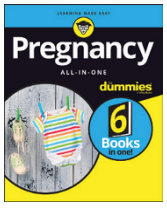

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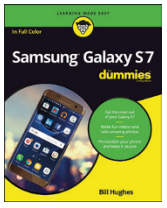

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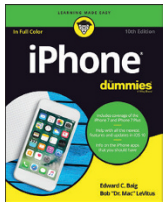

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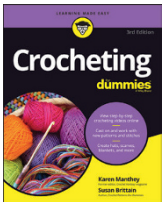

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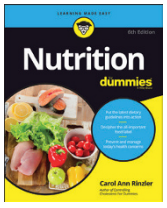

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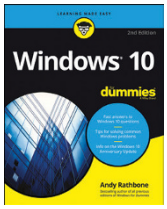

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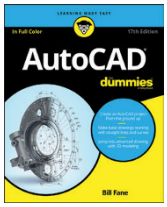

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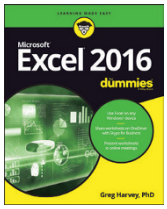

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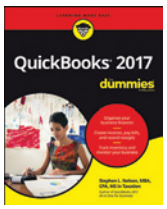

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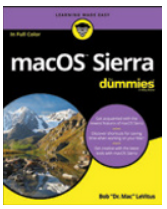

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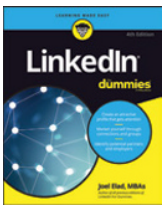

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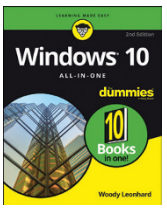

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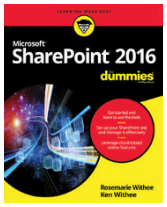

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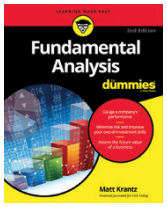

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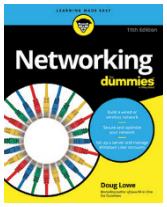

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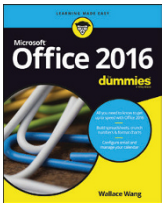

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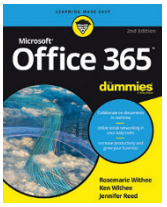

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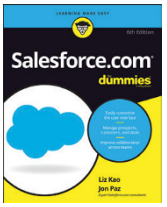

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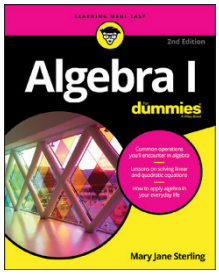

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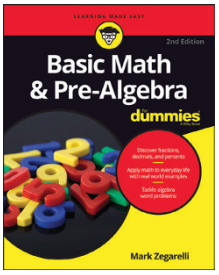

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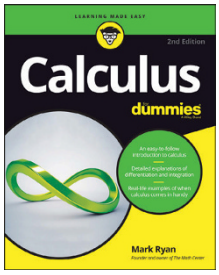

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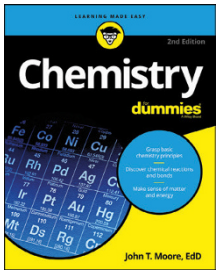

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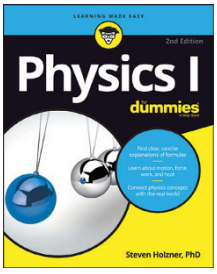

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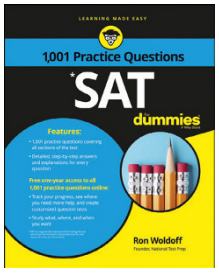

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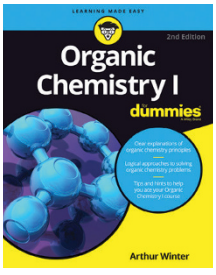

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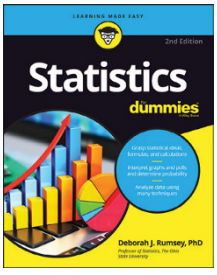

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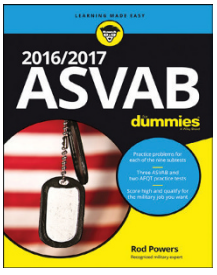

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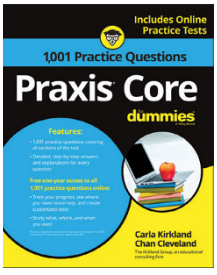

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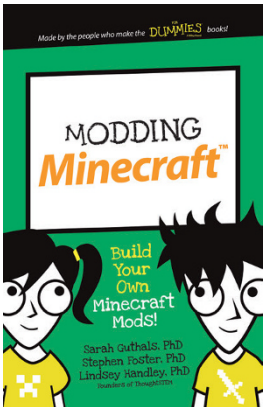

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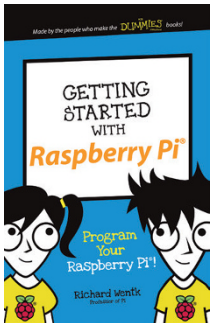
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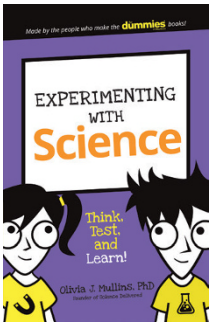

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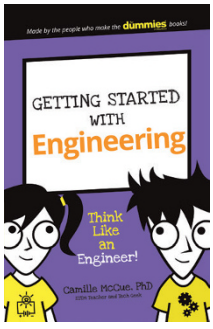
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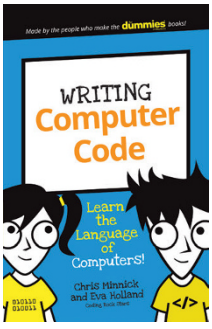
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